SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1923.

No. 830.

HARRY B. STILZ, APPELLANT,

vs.

THE UNITED STATES.

APPEAL FROM THE COURT OF CLAIMS.

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1 Court of Claims of the United States.

HARRY B. STILZ
vs.
THE UNITED STATES.
No. B–25.

I. *History of proceedings.*

On February 16, 1922, the plaintiff filed his original petition.

On March 7, 1922, the defendant filed a demurrer to said petition.

Subsequently, to wit, on March 24, 1922, by leave of court, the plaintiff filed his amended petition.

On April 10, 1922, by leave of court, the demurrer to the original petition was withdrawn by defendant.

The amended petition, filed March 24, 1922, is as follows:

2 II. *Amended petition.*

Filed March 24, 1922.

To the honorable the COURT OF CLAIMS.

The claimant, Harry B. Stilz, respectfully represents:

I. He is a resident of the city of Philadelphia, in the county of Philadephia and State of Pennsylvania.

II. On the 18th day of November, 1908, claimant, being within the meaning of the statutes of the United States then in force, the inventor of certain improvements in oil burners and being entitled to a patent thereon under the provisions of said statutes, duly filed in the Patent Office of the United States on application for letters patent for said invention; and on the 11th day of January, 1910, all the requirements of the statutes then in force having been complied with, letters patent of the United States, No. 945873, were duly issued pursuant to said application, and thereby claimant became, and now is and continues to be, the sole and exclusive owner of said letters patent of the United States and of the invention or improvement therein described and claimed.

III. On the 8th day of May, 1911, claimant, being within the meaning of the statutes of the United States then in force, the inventor of certain improvements in oil burners and being entitled to a patent thereon under the provisions of said statutes, duly filed in the Patent Office of the United States an application for letters patent for said invention; and, on the 1st day of July, 1913, all of the requirements of the statutes then in force having been complied with, letters patent of the United States, No. 1066161, were duly issued pursuant to said application, and thereby claimant became and now is and continues to be, the sole and exclusive owner of said letters patent of the United States and of the invention or improvement therein described and claimed.

IV. Claim 2 of patent No. 945873 and claims 1, 6, and 7 of patent No. 1066161 broadly cover a new principle in the art of burning oil, which has been widely demonstrated to be an epoch-making improvement.

V. Said improvement was reduced to practice as a demonstrated success during August of 1910. Shortly afterwards, the Bureau of Steam Engineering, Navy Department, made and tested, at the Philadelphia Navy Yard, fuel-oil burners in which said principle was embodied.

VI. The Navy Department, since then, has manufactured, at the Philadelphia Navy Yard, oil burners which infringe said patents, and oil burners which likewise infringe said patents have been manufactured for the United States by the Schutte & Koerting Co. of Philadelphia, the Babcock & Wilcox Co. of New York, the Bethlehem Shipbuilding Corporation (Ltd.), and probably others.

VII. With comparatively few exceptions, said infringing oil burners were manufactured by or for the United States during the six years prior to Feb. 16, 1922, and they continue to be used by the United States to the present day.

VIII. Claimant has given notice of said letters patent, as required by the statute in such case provided.

3 IX. The invention described in and covered by said letters patent of the United States, #1066161, has been used and manufactured by and for the United States, during the six years prior to the filing of this petition, without license or lawful right to use or manufacture the same. Claimant therefore seeks his remedy by a suit herein for the recovery of his reasonable and entire compensation, in accordance with the act of June 25, 1910, chapt. 423 (36 Stat. L. 851), amended by the act of July 1, 1918, chapt. 114 (40 Stat. 704).

X. By reason of the facts aforesaid there is justly due to claimant from the United States a sum of money equal to the difference in the cost of oil fuel, which has been burned, during the six years preceding Feb. 16, 1922, by means of said infringing oil burners and the cost of oil fuel, which would have been consumed in order to obtain the same results, during the same time, had it been burned by means of the next best oil burner, which was then on the market, plus such royalties as the United States might have been obliged to pay for the right to use the latter burner, plus the reduction in first cost of boilers, equipment, etc., required to deliver the maximum power desired in the various installations, which have been made by and for the United States, where fired with said infringing oil burners from what said first cost would have been, had any other oil burner been used for firing said boilers.

XI. No other action has been had on said claim in Congress or by any of the departments; no person, other than the claimant, is the owner thereof or interested therein; no assignment or transfer of this claim, or any part thereof or interest therein, has been made; the claimant is justly entitled to an amount as herein claimed from

the United States, after allowing all just credits and offsets; the claimant has at all times borne true allegiance to the Government of the United States and has not in any way voluntarily aided, abetted, or given encouragement to rebellion against the said Government. The claimant is a citizen of the United States.

Claimant therefore prays that defendant may be decreed to account for and pay to claimant the gains unlawfuly derived from the violation of claimant's rights.

HARRY B. STILZ.

[Jurat showing the foregoing was duly sworn to by Harry B. Stilz omitted in printing.]

4 III. *Argument and submission of case.*

On June 4, 1923, this case was argued and submitted on merits by Mr. Harry B. Stilz, for plaintiff, and by Mr. John W. Loveland, for defendant.

IV. *Proceedings after submission of case.*

On November 5, 1923, the court filed findings of fact and conclusion of law and entered a judgment dismissing the petition, with an opinion by Booth, J.

On November 19, 1923, the plaintiff filed a motion for a new trial, and for amendment of findings.

V. *Orders of Court entered December 17, 1923.*

IT IS ORDERED BY THE COURT that the plaintiff's motion for amendment of findings be and the same is allowed in part and overruled in part. The former findings of fact are vacated, set aside, and withdrawn, and amended findings are this day filed—the former judgment and opinion to stand.

The plaintiff's motion for a new trial is overruled.

5 VI. *Amended findings of fact, conclusion of law, and opinion of the court by Booth, J. Entered December 17, 1923.*

This case having been heard by the Court of Claims, the court, upon the evidence, makes the following

Amended findings of fact.

I.

At various times from 1900 to 1911, inclusive, the plaintiff, Harry B. Stilz, was in the employ of the United States. From 1900 to 1905 he was an employee in the Bureau of Construction and Repair of the Navy Department, and subsequently he was at various times

in the employ both of private shipbuilding companies and of the United States navy yards at Philadelphia, Pa., and Mare Island, California. During all of the time of such employment his duty and work included the examination, designing, and making of drawings relating to oil burners or oil-burning devices for oil-heated furnaces, and he had access to the various drawings, blueprints, and publications relating to such devices, at the places where he was employed.

II.

On November 18, 1908, plaintiff filed an application in the United States Patent Office for letters patent for certain improvements in oil burners, upon which application there were granted to him, under date of January 11, 1910, United States Letters Patent No. 945873, a copy of which is by reference made a part of these findings of fact as Exhibit A.

III.

On the 8th of May, 1911, the plaintiff, while in the employ of the United States at the Mare Island Navy Yard, filed an application with the United States Patent Office for letters patent on certain improvements in oil burners, upon which application there were granted to him, under date of July 1, 1913, United States Letters Patent No. 1066161, a copy of which is by reference made a part hereof as Exhibit B.

6 The proceedings in the Patent Office upon said application are shown by the file wrapper and contents of the case, a copy of which is by reference made a part hereof as Exhibit B–1.

IV.

In the successful burning of oil for fuel the oil must be atomized; that is, reduced to the form of fine spray, to permit of its admixture with the proper amount of air necessary for combustion; and at the time of the filing by plaintiff of his said applications for letters patent there were, as appears from the prior art hereinafter disclosed, two general types of oil burners in use for the firing, or heating, of boilers or furnaces. These types differed in the method of the atomization of the oil, and were generally known and referred to as "mechanical atomizers" and "steam atomizers."

In the mechanically atomizing burner the oil was atomized by purely mechanical means by being projected, under great pressure, from the burner into the furnace in a whirling cone-shaped film, which almost immediately developed into a fine spray, air for combustion being admitted through a surrounding air register and becoming more or less intimately intermixed with the oil spray.

In the so-called steam atomizer burner there was a combination with the stream of oil, while yet within the burner proper, of a stream of steam, or of air or other gaseous fluid under pressure, for the purpose of aiding in the atomization of the oil, the air for combustion being admitted and intermixed with the oil spray as in the case of the mechanically atomizing burner.

V.

In the prior art to which the plaintiff's said Letters Patent No. 945873 relate there were, among others, the structures disclosed by the following patents and publications, which are hereby made a part of these findings of fact as Exhibits C–1 to C–17, inclusive:

1. British patent No. 2414, to Norton and Hawksley, Aug. 22, 1867—Exhibit C–1.

2. U. S. patent No. 391865, to Schutte, Oct. 30, 1888; application filed Nov. 5, 1887—Exhibit C–2.

3. U. S. patent No. 481088, to Chaney and Wires, Aug. 16, 1892; application filed Jan. 12, 1892—Exhibit C–3.

4. British patent No. 17938, to Rusden and Eeles, July 25, 1896; application filed Sept. 25, 1895—Exhibit C–4.

5. U. S. patent No. 584951, to Moore, June 22, 1897; application filed Nov. 21, 1896—Exhibit C–5.

6. U. S. patent No. 629338, to Chelimsky, July 25, 1899; application filed Nov. 29, 1898—Exhibit C–6.

7. U. S. patent No. 630320, to Billow, Aug. 8, 1899; application filed June 28, 1898—Exhibit C–7.

8. U. S. patent No. 638340, to Kermode, Dec. 5, 1899; application filed Dec. 5, 1898—Exhibit C–8.

9. British patent No. 24021, to Carr, Oct. 22, 1903; application filed Nov. 3, 1902—Exhibit C–9.

10. United States naval report, "Liquid Fuel," published in 1904, pages 70 to 100, 215 to 270, and 320 to 363—Exhibit C–10.

7 11. British patent No. 15269, to Kermode, July 8, 1905; application filed July 8, 1904—Exhibit C–11.

12. British patent No. 3089, to Armstrong, Jan. 19, 1905; application filed Feb. 8, 1904—Exhibit C–12.

13. British patent No. 10326, to Meyer, Jan. 24, 1907; application filed May 2, 1906—Exhibit C–13.

14. U. S. patent No. 903736, to Lee, Nov. 10, 1908; application filed Aug. 15, 1907—Exhibit C–14.

15. Blue print of drawing of Bureau of Steam Engineering, Navy Department, Washington, D. C., Jan. 6, 1908, No. "11–Y–130," sheet 1—Exhibit C–15.

16. London, England, publication, "Engineering," of June 19, 1908, pages 805 to 808—Exhibit C–16.

17. Photographic copy of drawing No. "11–Y–139," Department of Steam Engineering, Navy Yard, Norfolk, Va.—Exhibit C–17.

VI.

In the prior art to which the plaintiff's said Letters Patent No. 1066161 relate, there were, in addition to the structures shown by the patents and publications set forth in Finding V, as Exhibits C–1 to C–17, the structures, or devices, disclosed by the following patents and publications, which are hereby made a part of these findings of fact as Exhibits D–1 to D–9, inclusive:

1. French patent No. 396292, to Corneuve; application filed Oct. 29, 1908; delivered Jan. 22, 1909; published Apr. 6, 1909—Exhibit D–1.

2. French patent No. 396476, to Pages; application filed Jan. 27, 1908; delivered Jan. 28, 1909; published Apr. 13, 1909—Exhibit D–2.

3. Blue print of drawing No. "A 643" by Schutte & Korting Co., Philadelphia—Exhibit D–3.

4. French patent No. 396955, to Normand; application filed Dec. 1, 1908; delivered Feb. 9. 1909; published Apr. 26, 1909—Exhibit D–4.

5. British patent No. 20653, to Bevis, Oct. 1, 1909, application filed Oct. 1, 1908—Exhibit D–5.

6. British patent No. 15747, to Laing, Aug. 8, 1910; application filed July 6, 1909—Exhibit D–6.

7. U. S. patent No. 1020048, to Normand, Mar. 12, 1912; application filed Nov. 11, 1909—Exhibit D–7.

8. U. S. patent No. 1025279, to Laing, May 7, 1912; application filed Feb. 16, 1910—Exhibit D–8.

9. U. S. patent No. 1023707, to Anthony, Apr. 16, 1912; application filed June 1, 1910—Exhibit D–9.

VII.

Since the granting to the plaintiff of his said Letters Patent Nos. 945873 and 1066161, and subsequent to February 16, 1916, there have been manufactured or used by the United States oil burners and equipment alleged by plaintiff to infringe his said letters patents of the type and character shown by the following blue prints and photographic copies of drawings, which are hereby made a part of these findings of fact as Exhibits E–1 to E–7, inclusive:

8 1. Blue prints of tuyere and burner for "U. S. T. B. destroyers," Bath Iron Works, Bath, Maine; file Nos. 0294 and 0295—Exhibits E–1 and E–2, respectively.

2. Blue print of Navy "Bureau standard natural forced draft air register," file No. 414; and photoprint of "Bureau standard natural forced draft register"—Exhibits E–3 and E–4, respectively.

3. Blue print showing "Arrangement of Yarrow boiler," file No. 0118; and photoprint of "Bureau standard register (Cramp modification)"—Exhibits E–5 and E–6, respectively.

4. Photoprint of "Peabody register and burner"—Exhibit E–7.

As appears from said exhibits and other evidence in the case, said oil burners and equipment provided for the atomization of the oil

by means of its projection into the furnaces under heavy pressure through spiral passages in the nozzle end of the burner in a whirling cone-shaped film of oil, which almost immediately upon leaving the nozzle of the burner developed into a fine spray. The air for combustion was furnished under mild blower pressure in the furnace room through an air register surrounding the burner and burner opening into the furnace, this air register being provided with vanes or other means for giving the air a whirling motion to facilitate the intermixture with the oil spray around and into which it was discharged, the oil and the air being whirled in the same direction. No steam, air, or other gaseous fluid was introduced into or used in the burner proper for any purpose nor used with any part of the equipment for the atomization of the oil, the air supplied through the air register encircling the burner proper being for supplying the oxygen sary for the combustion of the oil.

VIII.

The claims of the plaintiff's said letters patent, for infringement of which recovery is sought by plaintiff in this suit, are claim 2 of Letters Patent No. 945873 and claims 1, 6, and 7 of Letters Patent No. 1066161.

IX.

The devices of said Letters Patent No. 945873 are illustrated by the patent drawing reproduced and shown in the appendix hereto. Figure 1 of the drawing is a sectional elevation through the nozzle and connections at right angles to the axis of the nozzle. Figure 2 is a section through the axis of the nozzle. Figure 3 is a plan view of the burner with a part of the furnace shown in section, and it also shows the circular air register attached to the end of the furnace, through the center of which the oil is projected from the nozzle of the burner into the furnace, and through the ports of which, 14, the air for combustion passes into the furnace.

The invention provides for the use of steam, air, or other gaseous fluid under pressure in the following manner, as an aid in the atomization of the oil. Referring to the drawing, oil under heavy pressure passes through the supply pipe 9, filter 8, and port 4 and is discharged tangentially into the annular space of the nozzle, between the outer casing 1 and the center plug 2, thus giving the oil
9 a rotary motion in the nozzle. The steam or other fluid under pressure passes through the pipe 10 and port 5 and is also discharged tangentially into said annular space of the nozzle, in the same direction as the oil, with which it rotates and mixes, disintegrating or atomizing the oil, which issues from the orifice 3 of the nozzle at a high velocity through the air register and into the furnace in a cone-shaped film and spray. Air for combustion is supplied through the ports 14 of the air register, the air encircling and mixing

with the oil spray in the air register, and in the furnace, where combustion takes place.

Claim 2 of this patent, alleged by plaintiff to be infringed by the United States by the manufacture or use of the devices specified and described in Finding VII, reads as follows:

"A nozzle having a restricted discharge orifice and independent inlets for a gaseous fluid and a liquid, there being a passage from each of said inlets to the discharge orifice, said passages having a portion in common which forms a mixing chamber, and each of said passages being arranged to produce a rotary motion in the fluid passing therethrough toward the discharge orifice."

The patent drawing illustrating the devices of plaintiff's said Letters Patent No. 1066161 is shown in the appendix hereto. Figure 1 of the drawing is a longitudinal section through the burner end of a furnace 1, equipped with an air register 4 and burner 7. Figure 2 is a transverse section of the furnace on line 2–2 of Figure 1. Figure 3 is a transverse section through the nozzle of the burner. Figure 4 is a central longitudinal section through the nozzle.

The devices of this patent also provide for the use of steam, air, or other gaseous fluid under pressure as an aid in the atomization of the oil, but in a different manner from that provided by the devices of patent No. 945873, the operation here being as follows:

Referring to the drawing, oil under heavy pressure is forced through the pipe 9, spiral 15, and orifice 14 into and through the front of the annular space 18, between the inner casing 12 and outer casing 17 of the nozzle, in a rapidly rotating cone-shaped film. The steam, air, or other fluid under pressure passes through the pipe 10 and is discharged tangentially into the said annular space 18, rotating around in it and toward the discharge outlet 19 in a whirling layer. The oil leaving the inner orifice 14 in a conical film or spray is struck by the rotating steam before it passes through the outer orifice 19, which steam aids in the atomization of the oil.

Air for combustion is supplied through the ports 5 of the circular air register 4 attached to the furnace front, and through the center of which the oil is projected from the nozzle of the burner into the furnace in a cone-shaped spray, the air from the register flowing in all around the oil spray and mixing with it in the register and in the furnace, where combustion takes place.

XI.

It does not appear that any of the devices of the plaintiff's said Letters Patent No. 945873 and No. 1066161 have been manufactured or used by the United States or that said letters patent have been infringed by the United States.

XII.

It does not appear from the evidence whether the plaintiff gave to the public the notice required by section 4900 of the U. S. Revised

Statutes as to the devices of his said letters patent being patented, or that he at any time during the alleged infringement of said letters patent for which recovery is sought by him notified the defendant of such alleged infringement.

XIII.

At the time of the filing of the plaintiff's petition in this suit there were pending in the United States District Courts for the Southern District of New York and the Eastern District of Pennsylvania, respectively, suits by the plaintiff against the Babcock and Wilcox Company, of New York City, and the Schutte & Koerting Company and the Bethlehem Shipbuilding Corporation, of Philadelphia, Pa., for an injunction against each of the defendants in said suits and an accounting by them for profits for alleged infringement by them of the plaintiff's said Letters Patent No. 1066161 in the manufacture and sale by them of certain oil burners, some of which were alleged to have been sold to the United States Navy for installation and use on naval vessels of the United States.

It appears from the evidence that the suit against the Babcock & Wilcox Company was pending in the court as late as February 14, 1922, and the suit against the Schutte & Koerting Company and the Bethlehem Shipbuilding Corporation as late as January 22, 1923; and it does not appear that either suit has yet been dismissed or otherwise finally disposed of in said courts.

Conclusion of law.

Upon the foregoing findings of fact the court decides, as a conclusion of law, that the petition herein should be, and the same is, dismissed.

Appendix.

H. B. STILZ.

OIL BURNER.

APPLICATION FILED NOV. 19, 1908.

945,873. Patented Jan. 11, 1910.

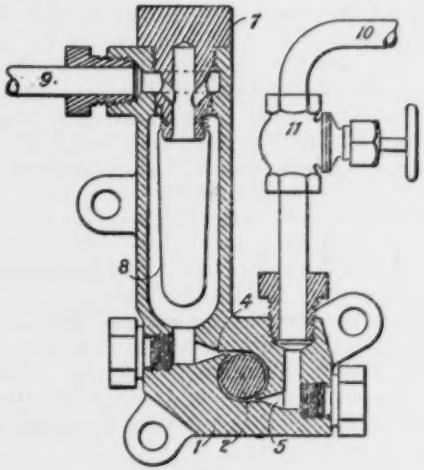

FIG. 1

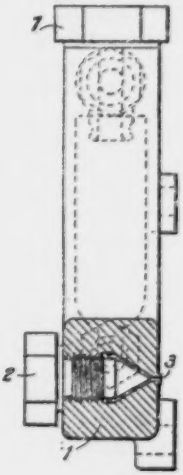

FIG. 2

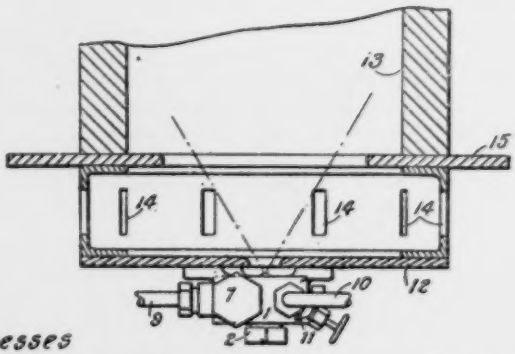

FIG. 3

Witnesses

Inventor

Harry B. Stilz

H. B. STILZ.

OIL BURNER.

APPLICATION FILED MAY 6, 1911.

1,066,161. Patented July 1, 1913.

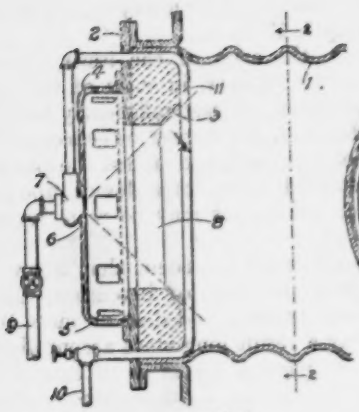

FIG. 1

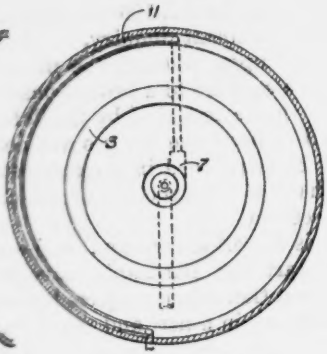

FIG. 2

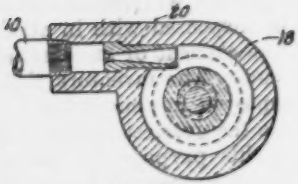

FIG. 3

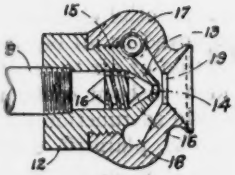

FIG. 4

Witnesses
L. V. Bardeen
Ruby V. Bydges.

Inventor:
H. B. Stilz
per
Chamberlin Brenderwood
Attorneys.

BOOTH, *Judge*, delivered the opinion of the court.

The plaintiff brings this suit to recover for an alleged infringement of his patents. The case is here under the act of July 1, 1918, 40 Stat. 705, and compensation is sought for infringement of claim 2 of patent No. 945873 and claims 1, 6, and 7 of patent No. 1066161. The patents involved relate exclusively to oil burners. The plaintiff was granted Letters Patent No. 945873 on January 11, 1910, and Letters Patent No. 1066161 on July 1, 1913.

The pertinent inquiry, in fact, the crux of the issue, depends entirely upon whether the plaintiff's patents, in view of the prior art, are entitled to a broad construction, at least sufficiently broad to cover the devices used by the defendant, for it must be conceded that in all respects the devices are not identical, and unless the plaintiff may by the record in the case establish a user of a device, upon the mechanical construction of which his claims may be read, he may not recover.

It is a well-known and long-established precedent that where the prior art has inevitably narrowed the field of invention, and a patentee thereafter projects himself therein, and does no more than accomplish in a new and novel way a result long since accomplished, he can not assert the right of a primary patentee to extend his patent beyond the express limitations of his claims. *Singer Manufacturing Co.* v. *Cramer*, 192 U. S. 265.

Beginning in 1899, and from thenceforward, as shown by the numerous inventions set out in the findings, many inventors turned their attention to oil burners. The patents without exception disclose two essential elements, not to be dispensed with in all devices to be employed as oil burners, i. e., the element of *atomization* and the admission of air to cause combustion. The inventors, therefore, were and have been continuously employed in conceiving a device which would so function as to produce the greatest efficiency in this respect. The plaintiff dedicated to this purpose his two inventions. His first improvements, for which he secured Letters Patent No. 945873, is precisely stated in his specifications as intended to accomplish a fourfold purpose—first, "to construct a burner which will efficiently burn any of the different kinds of fuel oil used in practice; second, to reduce to a minimum the amount of air or steam used as an atomizing agency when starting the flame; third, to produce an oil spray which, when under normal firing conditions, will be sufficiently atomized to cause perfect combustion without the aid of an external atomizing fluid; and fourth, to render the system simple and easily accessible for cleaning." The device which was brought into existence to bring about these contemplated results was expressly designated by the inventor "to be an improvement in oil burners in which the oil is atomized principally by mechanical means." Claim 2 of the above patent, the only one alleged to be infringed by the defendant, is somewhat general in

language, but when read in conjunction with the specifications and detail references to the drawings, it is manifest that the inventor was claiming novelty for a device so constructed as to produce a higher degree of atomization than the old devices had produced by purely mechanical means. The claim recites: "A nozzle having a restricted discharge orifice, and independent inlets for a
14 gaseous fluid and a liquid, there being a passage from each of said inlets to the discharge orifice, said passages having a portion in common which forms a mixing chamber, and each of said passages being arranged to produce a rotary motion in the fluid passing therethrough toward the discharge orifice." The plaintiff does not contend that a restricted discharge orifice in an oil-burner nozzle is new; neither may he assert that producing atomization by a violent whirling motion is new. As a matter of course, in any device there must at least be a passage for the introduction of oil, so the improvement designed is necessarily restricted to the creation of a device so constructed that oil and steam may enter simultaneously at varying degrees of pressure into the mixing chamber he constructs, so that he may not only add to the velocity of rotation produced by mechanical means, but appreciably and effectively in disintegrating the oil and producing a much more perfect atomization of the same. While this may not be said to be a strictly mechanical device, still if you remove the element of gaseous fluids introduced in the mixing chamber you have the old mechanical method, old in the art, and the one the inventor was intending to improve. We can not escape this construction of the claim, because the plaintiff says in his specifications: "When starting the combustion, however, conditions are such that auxiliary means are useful to bring desired results. At this stage the oil should preferably be diluted with air, steam, or other gaseous fluid, which affords an additional agency for not only inducing a strong current of air supply, but also for distributing the atomized oil through a large volume." The *auxiliary means* employed to improve the old mechanical process was the introduction tangentially into the mixing chamber of the gaseous fluids as described for the express purposes hereinbefore alluded to. If the Government did not use this device, it is not an infringer.

In 1913 the inventor, a distinguished and expert mechanic, again secured Letters Patent No. 1066161 for improvements in oil burners, and it is now insisted that claims 1, 6, and 7 of this patent were infringed by the defendant. The imperfections, among many others, which he was seeking to remedy in the last device, as appears from the specifications, was the apparent inability of the old device to so atomize the oil that it might be readily ignited in the combustion chamber on a cold morning without producing too great a volume of smoke, and that certain qualities of oil, particularly California oil—of which State the inventor was a resident—could not be readily heated so that it would flash into a vapor upon delivery from the nozzle, where mechanical means of atomization were alone employed. Another serious defect of the old inventions was the restricted de-

livery orifice, which because of its size was subject to choking up. To overcome these apparent defects the plaintiff designed a device which retained the idea of a mixing chamber, but completely reversed the method of accomplishing the result. Instead of introducing the gaseous fluids into the chamber immediately surrounding the means adopted to produce a whirling motion, and there mixing the oil and gaseous fluids prior to their discharge through the restricted orifice, a separate casing was attached to and entirely surrounding the nozzle, with a much larger but still restricted orifice, concentrically located as to the smaller one, into which the gaseous fluids are introduced, passing through the casing in a whirling motion, thereby securing the coveted heating and greater atomization of the oil after it leaves the small and first restricted orifice, resulting, as claimed, in a much expanded triangle of vaporization and greatly improved atomization, and facilitating the use of any quality of fuel oil.

We set forth claims 1, 6, and 7 in the margin.[1]

Claim 1 covers in detail the detached device, and claims 6 and 7 the identical device in combination with a furnace. Reading the claims involved in the light of the specifications and the prior art, it is not for us to say in this litigation that the plaintiff failed in any particular to reach the goal he set out to negotiate. Granting the validity of all he claims, it must be conceded that if a user is content with a device falling short of attaining the perfection the patent in suit attains, we can not hold him responsible as an infringer if he does not trespass upon the newer and improved device by adopting its mechanism to attain the desired end. Neither may we do so if the alleged infringer attains by another and distinct device the very same result, if the art is so narrow as to preclude the assertion of a claim for more than an identic device to accomplish a purpose long since accomplished and old in the art. The plaintiff's patents, as we conceive them, are, so far as the record discloses, admirably adapted to secure an improved degree of atomization of fuel oil. The method he points out sets before the public a device which utilizes the agencies indispensable to be utilized, agencies well known and long employed, to attain improved atomization and fuel combustion and afford a practical oil burner, but we are unable to perceive that the plaintiff has done more than this. The history of the patents in the Patent Office is confirmative evidence of this fact. From an already crowded art he evolved a distinct device, differing in

[1] "1. A nozzle having a small discharge orifice, means immediately adjacent to said orifice for producing a whirling motion in a liquid fluid passing therethrough, a casing surrounding said nozzle and having a restricted discharge port concentric with said orifice and means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current.

"6. In combination, a furnace having an admission hole through its casing, a nozzle having means for projecting a hollow cone-shaped film of oil from a round unobstructed delivery orifice into said furnace through said hole, means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil and means for supplying air into the furnace through said hole.

"7. In combination, a furnace having an admission hole through its casing, a lining of refractory material for said hole, a nozzle having means for projecting a hollow cone-shaped film of oil into said furnace through said hole, means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil, and means for supplying air into the furnace through said hole."

some important particulars from previous ones. For this device he secured letters patent, and unless the defendant seizes upon his patented device and takes advantage of the new and improved essential functioning elements of his device, it is not an infringer of the same. *Greene* v. *Buckley*, 135 Fed. 520.

If we are correct in the foregoing conclusion, the defendant is innocent of infringement. The defendant in its devices does not, and has not for a period antedating the granting of plaintiff's patent, used steam or other gaseous fluids in the process of antomization. The defendant made and used a device designated in the art as a mechanical oil burner, and in this device atomization is the result of mechanical means. The defendant's oil nozzle is devoid of any casing attached thereto, and it does not employ a mixing chamber where the oil and gaseous fluids are mixed, prior to discharge into the combustion chamber. Atomization in the defendant's device is produced by pressure and the rotation of the oil as it issues from the nozzle unaided by any extraneous gaseous fluids introduced into the nozzle or attached casing. We need not speak in detail of means employed to use air for combustion. Both employ an air register, manifestly old in the art. The record furnishes ample room for the statement that what the defendant made and used, and is now using, is substantially the old mechanical oil burner without the improvements claimed for in plaintiff's letters patent.

We have not been able to illustrate the defendant's device, as we have the plaintiff's, because the size of the drawings preclude their reproduction at any reasonable expense. Se we must be content with making the same part of the findings by reference.

A large number of authorities have been cited in the briefs filed. It is quite unnecessary to review them in detail. The fundamental principles of differentiation are obvious and elementary. The case presents to us the one issue, adverted to in the beginning of this opinion. We have been unable after mature deliberation to escape the conclusion that the plaintiff's claims to invention may not under the law be accorded a wider scope than the bringing into existence of improvements to a device old in the art, well known to the public, and in settled use. That the defendant did not make or use this identic device as improved is apparent from a mere examination of its exhibits. It seems to us impossible to read the claims of the plaintiff's patent alleged to be infringed upon the mechanical construction of the defendant's device.

There are several other defenses interposed to the plaintiff's right of recovery. We have given them consideration, but regard it as unnecessary to discuss them in view of what has been said. It would not do to say they are entirely without merit, but inasmuch as the issue may be determined without recourse thereto, we have deemed it unnecessary to prolong this opinion.

The petition will be dismissed. It is so ordered.

GRAHAM, *Judge;* HAY, *Judge;* DOWNEY, *Judge;* and CAMPBELL, *Chief Justice*, concur.

17 VII. *Judgment of the Court.*

At a Court of Claims held in the City of Washington on the Seventeenth day of December, A. D. 1923, judgment was ordered to be entered as follows:

The Court, upon due consideration of the premises, find in favor of the defendant, and do order, adjudge, and decree that the plaintiff, as aforesaid, is not entitled to recover and shall not have and recover any sum in this action of and from the United States; and that the petition herein be and the same hereby is dismissed.

BY THE COURT.

VIII. *Plaintiff's application for appeal.*

Filed Jan. 21, 1924.

The claimant, Harry B. Stilz, makes application to the Honorable Court of Claims for an appeal of the case. Harry B. Stilz vs. The United States, No. B–25, to the Supreme Court of the United States.

HARRY B. STILZ, *Claimant.*

IX. *Order allowing plaintiff's application for appeal.*

Filed Jan. 28, 1924.

IT IS ORDERED BY THE COURT that the plaintiff's application for appeal be and the same is allowed.

BY THE COURT.

18 Court of Claims of the United States.

[Title omitted.]

I, F. C. Kleinschmidt, Assistant Clerk Court of Claims, certify that the foregoing are true transcripts of the pleadings in the above-entitled cause; of the findings of fact (as amended), conclusion of law and opinion of the court by Booth, J.; of the judgment of the court; of the plaintiff's application for appeal; of the order of the court allowing said application.

IN TESTIMONY WHEREOF I have hereunto set my hand and affixed the seal of said Court at Washington City, this second day of February, A. D. 1924.

[SEAL.] F. C. KLEINSCHMIDT,
Assistant Clerk Court of Claims.

[Indorsement on cover:] File No. 30,140. Court of Claims. Term No. 830. Harry B. Stilz, appellant, vs. The United States. Filed February 21, 1924. File No. 30,140.

O

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1924.

No. 296.

HARRY B. STILZ, APPELLANT,

vs.

THE UNITED STATES.

Appeal from the Court of Claims.

Appellant's Brief.

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STATEMENT OF THE CASE.

This suit was brought into the Court of Claims, under the act of July 1, 1918, 40 Stat. 705, for the alleged infringement of two patents by the United States Navy Department. The first patent, No. 945,873, was granted to Harry B. Stilz on January 11, 1910 for an improvement in oil burners. It has little value beyond being the progenitor of a later improvement for which letters patent No. 1,066,161 were granted to the same inventor on July 1, 1913.

Claim 2 of patent No. 945,873, which is relied upon in this suit, reads as follows:

> "A nozzle having a restricted discharge orifice, and independent inlets for a gaseous fluid and a liquid, there being a passage from each of said inlets to the discharge orifice, said passages having a portion in common which forms a mixing chamber, and each of said passages being arranged to produce a rotary motion in the fluid passing therethrough toward the discharge orifice."

It may be considered a genus claim, which is alleged to broadly cover the constructions of more recent origin, which have since proved to be most efficient in the art of burning fuels. The device which is described in said patent, however, has no bearing on the question at issue herein, since it belongs to a different species from the burners in suit.

The device which is illustrated and described in patent No. 1,066,161 is alleged to perform precisely the same function as is performed by the burners in suit. Claims 1, 6 and 7 of the latter patent, which are relied upon in this suit, are as follows:

> "1. A nozzle having a small discharge orifice, means immediately adjacent to said orifice for producing a whirling motion in a liquid fluid passing therethrough, a casing surrounding said nozzle and having a restricted discharge port concentric with said orifice and means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current."
>
> "6. In combination, a furnace having an admission hole through its casing, a nozzle having means for projecting a hollow cone shaped film of oil from a round unobstructed delivery orifice into said furnace through said hole, means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil and means for supplying air into the furnace through said hole."
>
> "7. In combination, a furnace having an admission hole through its casing, a lining of refractory material for said hole, a nozzle having means for projecting a hollow cone shaped film of oil into said furnace through said hole, means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil, and means for supplying air into the furnace through said hole."

The discovery, which is disclosed in patent No. 1,066,161, was made during August of 1910 (page 2, par. V) and, in view of the

protection provided in claim 2 of patent No. 945,873, no haste was made to file an application for a patent on it.

Appellant was an employee in the Bureau of Construction and Repair of the Navy Department from 1900 to 1905. From 1905 until April 5, 1911, when he accepted a temporary appointment at the Mare Island Navy Yard, appellant was neither directly nor indirectly employed by the United States Government.

On May 8, 1911, during the time of his employment at the Mare Island Navy Yard, appellant filed, in the United States Patent Office, the application upon which Letters Patent No. 1,066,161 were issued on July 1, 1913.

In the prosecution of said application, the examiner refused to allow any of the claims, as originally filed, or as were offered in the various subsequent amendments. An appeal was carried to the Examiners-in-Chief, whose opinion thereon (Appeal No. 6022 in Exhibit B-1) was as follows:

> "We regard all of the appealed claims as allowable, there being in the prior art, as it is revealed by the examiner, no construction in which a whirling liquid cone of fuel is projected through a surrounding and whirling gaseous mass. It is old to discharge a whirling body of liquid fuel through an orifice surrounding another orifice for the emission of a gas, but in such construction the centrifugal action has no effect upon the liquid and the liquid will not cross the path of and commingle with the mass of the gas.
>
> "The decision of the examiner is reversed."

Appellant, having discovered a new principle in the art of burning fuels, was allowed to claim a monopoly on every combination in which the elements are defined by the word "means", so long as the combination operates on the new principle.

His claims were not restricted to the use of any particular kind of gaseous fluid, which is directed so as to penetrate the cone-shaped film of oil, or to any degree of pressure behind the fluids, which are brought togther by means of the burner structure. The novelty consists in the production of the whirling cone of fuel which, by centrifugal action, is projected through the air which is supplied for its combustion.

The invention of the patent in suit is basic in so far as a hollow cone-shaped spray of liquid is penetrated by a surrounding and whirling gaseous mass.

The problems involved in the burning of oil are stated in the appendix on page 36; the prior art in the burning of oil with mechanical atomization is outlined on page 38; and appellant's improvement in oil burners, where atomization is accomplished principally by mechanical means, is briefly set forth on page 41.

The Court of Claims, in the opinion which was handed down on December 17, 1923, relegated said claims of patent No. 1,066,161 to the margin without further comment than: "It seems to us impossible to read the claims of the plaintiff's patent alleged to be infringed upon the mechanical construction of the defendant's device."

The Court of Claims virtually swept aside these claims, avoided the decision which had been rendered by the Examiners-in-Chief of the United States Patent Office and, without having shown any cause why it should be done, virtually reversed said decision in substantially the following language:

> "Plaintiff's claims to invention may not under the law be accorded a wider scope than the bringing into existence of improvements to a device old in the art, well known to the public and in settled use—this identic device as improved"—which, because "the art is so narrow as to preclude the assertion of a claim for more than an identic device to accomplish a purpose long since accomplished and old in the art", a mere "expert mechanic" could have designed. "We are unable to perceive that the plaintiff has done more than set before the public a device which utilizes the agencies indispensable to be utilized, agencies well known and long employed, to attain improved atomization and fuel combustion and afford a practical burner" for which "the fundamental principles of differentiation (from the alleged infringing burners) are obvious and elementary."

ERRORS IN THE DECREE OF THE COURT OF CLAIMS.

(a) No knowledge or appreciation of the importance of the property of diffusion in all combustion processes was displayed and therefore the nature of the invention which is involved in this suit, was not comprehended.

(b) No heed was given to the established rule of law, that it is the claim of a patent that defines the invention that is patented and determines the rights of the patentee, the specification and drawing of the patent being merely illustrative and explanatory of what is in the claim.

(c) Appellant's patent rights were virtually limited to a copy right of the identic device as illustrated, shorn of all the descriptive matter contained within the specification relative to the novel function which said device performs.

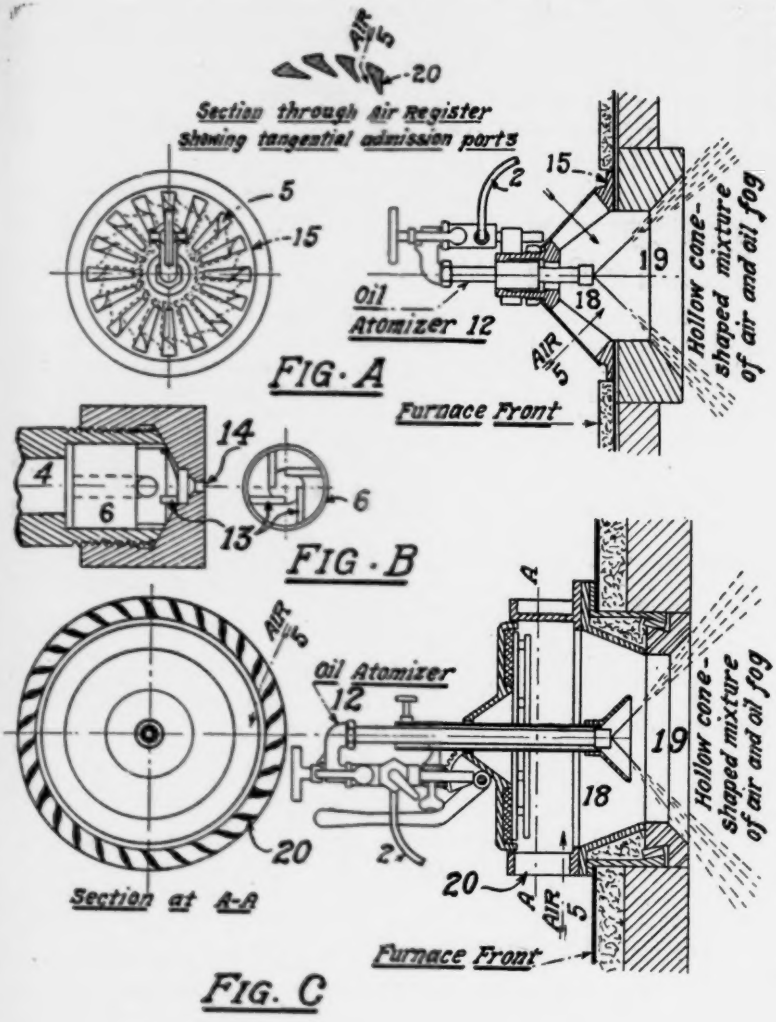
(d) It was held (Finding of Fact XII page 8) that the sworn statement of the plaintiff (Paragraph VIII, page 2), which was never denied by the defendant, does not constitute evidence.

(e) The contention that appellant had access to drawings, publications, etc., of oil burners, etc., at places where he was employed, was held to be material. (Finding of Fact No. I, page 3).

Invented things are not discovered in books; they are a product of some exercise of inventive faculties.

The primary question now at issue is whether the United States Patent Office was right, or whether the United States Court of Claims was right. If the Patent Office did not err in granting the claims in suit, the United States Navy Department must be guilty of infringement, since the oil burners in suit very clearly embody all of the elements which are set forth in said claims.

THE OIL BURNERS IN SUIT.



The United States Navy Department completed its first design of oil burners, which is alleged to embody said invention, on November 22, 1911. This design has since been designated the Bureau Standard Forced Draft Burner. Said first design is substantially as shown in Fig. A, which is a copy of Exhibit E-5. Exhibits E-1 and E-6 are likewise substantially the same as Fig. A.

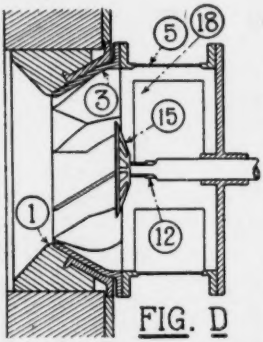


FIG. D

Fig. B shows the arrangement of passages for the oil within the discharge end of the Bureau Standard Atomizer, as shown in Exhibit E-2.

Fig. C represents a general arrangement of the Bureau Standard Natural Forced Draft Burner, copied from Exhibits E-3 and E-4

Fig. D represents the general arrangement of the burner (Exhibit E-7), which was manufactured by the Babcock & Wilcox Company, for use on the boilers of ships of the United States Navy.

Referring to Figs. B and C: Oil, under heavy pressure, is supplied to the atomizer 12, through the flexible tube 2, and passes through the central passage 4 leading to the nozzle which has a small discharge orifice 14. The plug 6, located within the nozzle, causes the oil to be divided into four streams, which flow at high velocity through the slots 13, to be discharged tangentially into a small chamber, which is immediately adjacent to the discharge orifice 14, thereby producing a whirling motion in the oil stream while passing therethrough.

Upon discharge, the oil spray takes the form of a cone-shaped film, composed of a myriad of streams, which rapidly break up into minute spheres, which ordinarily are projected forward in straight lines, the whirling motion in the oil film having ceased the instant the stream passes beyond the orifice 14.

The atomizer is located at the center of the burner casing to which it is secured. The casing is provided with vanes 20, which deflect the air tangentially and cause it to whirl around the atomizer as it is forced through the burner by means of centrifugal blowers, which discharge into an air-tight fire-room.

The conical surface within the burner casing, leading to the restricted discharge port 19, drives the whirling current of air in towards its axis of rotation ,thereby causing it to penetrate the oil film.

In Fig. A, precisely the same result is attained by means of the air register 15, which has a number of openings arranged around its conical surface and vanes are formed at said openings which deflect the air as it passes therethrough, so as to give it a whirling motion and likewise drive it in toward its axis of rotation.

In both burners, the oil film is converted into a whirling cone of fuel, which, by centrifugal action, is projected through and made to commingle with the air prior to its admission into the furnace.

In Fig. D, the air is admitted through four doors (5), which are arranged to guide it tangentially into the burner casing and cause it to whirl around the atomizer. A portion of this air passes through ports cut in the impeller plate (15), which is provided with a number of vanes, similar to those shown in the air register of Fig. A. The impeller plate (15) therefore gives to the air, which passes through the openings in it, an intensified whirl, while at the same time driving

it inward toward its axis of rotation. The major part of the air passes through the space between the periphery of the impeller plate (15) and the burner casing (3), it likewise being forced in a whirling current toward the axis by means of the conical surface leading to the restricted discharge port (1). The burner shown in Fig. D, therefore, combines in one structure both the methods for directing the air for combustion, as described in Figs. A and C.

The impeller plate (15) of Fig. D (likewise the air register 15, shown in Fig. A) functions precisely the same as, and is therefore the mechanical equivalent of, a casing having a restricted discharge port in combination with tangential inlets.

THE OIL BURNER ILLUSTRATED IN PATENT NO. 1,066,161.

Oil, under heavy pressure, is supplied to the atomizer 12, through the pipe 9, and flows at high velocity through the grooves of the spiral 15, to be discharged in a whirling current through the orifice 14. The resulting spray takes precisely the same form as that which is produced by the atomizer which is used in the burners in suit.

Surrounding the atomizer 12 is the casing 17, to which it is secured. Steam, under boiler pressure, is supplied from the pipe 10, through the nozzle 20, tangentially into the space 18. The whirling current of steam is driven in toward its axis of rotation by means of the conical surface leading to the restricted discharge port 19, where it penetrates the cone-shaped film of oil, which is discharged from the orifice 14 and converts it into a whirling cone of fuel. By centrifugal action, the oil is projected over the entire area of the admission port 8 to the furnace where it is forced to commingle with the air which is supplied for combustion, prior to entering the furnace.

This makes the front wall 3 of the furnace, containing the port 8, and the device 7, containing the ports 14 and 19, parts of the same structure, because they are all required to produce and confine a whirling cone of fuel in such a way that it may be projected uniformly through the air which is supplied for its combustion. And the patent claims in suit broadly cover all constructions, which effectually accomplish this result—a result which the United States Patent Office held had never been accomplished before, and no evidence to the contrary has since been discovered.

ALLEGED ANTICIPATION OF THE INVENTION DISCLOSED IN PATENT NO. 1,066,161.

The only reference, outside of those which had been cited by the Patent Office, which was alleged to be a complete anticipation of patent No. 1,066,161, is the Armstrong patent (Exhibit C-12). But the drawings in the Armstrong patent do not show any such structure as is claimed in patent No. 1,066,161. Certain vague statements, which are found in the Armstrong specifications, are relied upon to prove anticipation.

Now words are worthless things, unless they convey an idea or produce a result. An expert witness, appearing in this suit, was evidently the first person to discover that Armstrong knew and had shown others how to construct the type of oil burner, which is involved in this action. But for some reason Armstrong himself and all the others, prior to 1911, continued to make, use and vend burners, which are decidedly inferior to that type which he is now alleged to have included within the scope of the general language of his specification.

It remained for the wisdom that comes after the fact to teach that the thing, which had eluded the search of the world until Aug. 1, 1910, had been fully disclosed during 1904, through a combination of words, and that, if the proper meaning had been attached to each of these words and it had been known just how, when and where to bring into action, in a single structure, the elements thus described, the coveted result would have been produced—a problem which, having been solved, no longer presents any difficulty.

OBJECTS IN VIEW WHEN THE APPLICATION FOR PATENT NO. 1,066,161 WAS FILED.

The relevant objects in view were to "produce a burner which will produce perfect combustion by insuring a perfect admixture of air with the fuel right at the zone of combustion; to utilize the velocity of the atomizing steam in such a manner that it will be dissipated in diffusing the oil into a spray, which then enters the furnace at a relatively low velocity". .(page 1, lines 90 to 97 of patent No. 1,066,161) "thus affording the best opportunity for a perfect mixing of the jet with the air" (page 2, lines 127 to 129 of said patent).

It is also stated: "The oil leaves the inner orifice of the nozzle in a conical spray and, before it can pass through the outer orifice, it is caught by the rotating steam and is perfectly atomized. In this condition, the oil mixes with the requisite amount of air just as it reaches the hot refractory wall and perfect combustion ensues," (page 3, lines 1 to 8 of patent No. 1,066,161). "It will be understood that other gases than steam may be used for atomizing purposes." (Page 3, lines 18 to 20 of said patent).

"The nozzle may take various forms, so long as it produces a whirling spray of atomized oil under all conditions which are encountered in practice." (Page 2, lines 80 to 83 of said patent).

And no construction has since been devised which more effectually produces a whirling cone of nebulized fuel, or which yields a higher efficiency of combustion, than that construction which is illustrated in patent No. 1,066,161.

The object which the applicant for said patent had in view is still further disclosed in claim 11, forming part of his original application (paper No. 2 of Exhibit B-1). It reads:

> "In combination, a furnace having an admission hole through its casing, a nozzle having means for projecting oil into said furnace through said hole, and means within said nozzle for producing a whirling stream of gaseous fluid directed so as to swing said oil over an area filling said hole,

and means for admitting air into the furnace through said hole."

This claim was subsequently amended to the form in which it now appears as claim 6, in order to state with more particularity the elements required for high efficiency in the operation of this type of burner. In the "nozzle having means for projecting oil into said furnace" there must needs be included the means for likewise converting the oil into the form of a hollow cone-shaped film, in order that the spray may be distributed uniformly over the area of the admission hole into the furnace. Moreover, in order that the "whirling stream of gaseous fluid" may effectually "swing" the oil over the area of the admission hole, it is essential that it be "directed so as to penetrate said film of oil." Without such a penetration, the oil would not be converted into a whirling cone of fuel and it would therefore not "swing."

All of these elements were, of course, shown in the original drawings of said patent and they form part of all burners at present known, by means of which instantaneous diffusion and uniform admixture of air and fuel can be produced.

In line with the above, it is stated in the specification:

". . . it is possible to regulate the divergence of the spray so as to cause it completely to fill the opening (8) . . ." (page 2 lines 39 to 41)

"Consequently, the fuel and the incoming air are brought together in a zone where combustion immediately begins, so that perfect combustion of the oil results and the furnace becomes filled with a slowly moving flame which spreads out on all sides as soon as the refractory wall is passed." (page 2, lines 54 to 60).

HOW THE IMPROVEMENT DISCLOSED IN PATENT NO. 1,066,161 HAS BEEN EMBODIED IN THE BURNERS IN SUIT.

It requires a very considerable amount of energy in order to drive a whirling stream of gaseous fluid in toward the axis of rotation. The steam required to operate the blowers, which force the air through the burners in suit forms a very material part of the total steam generated by the heat, which the burners produce—in fact, several times the amount of steam which is required to operate the burner shown in patent No. 1,066,161 with equal combustion efficiency.

The air pressure carried within the closed fire rooms of the United States Navy ships, varies from 2 to 8 inches of water; and this theoretically gives to the air, escaping from under such pressures, velocities of from 92 to 184 feet per second (roughly from one to two miles a minute—and everyone knows that a mile-a-minute wind is by no means mild).

The rate of the gyrations of a whirling current of air, moving at such velocities, becomes very high, as the air currents approach the axis of gyration. These whirling air currents, therefore, exert a very considerable centrifugal force and a large component thereof operates directly against the pressure, which is produced by the air blowers.

In the prior art, where the whirling air currents were not driven in toward the axis, there is no component of the centrifugal

force, which is produced, to act against the blower pressure; the centrifugal action in such construction is fully met by the reaction from the casing for containing the air currents.

There is therefore more energy in a whirling current, which is driven in toward the axis of rotation, than in a whirling current, the particles of which, while traveling at the same velocity, are not forced to change their respective positions relative to the axis. Moreover, this energy, in the former case, is concentrated near the axis of gyration, producing a violent action at the very place where the cone-shaped film of oil is projected into it. There is as much difference in the effect produced within the burners of the prior art, which were mere modifications of Schutte's patent No. 391,865, and the burners in suit, where the whirling air is driven in toward the axis of gyration, as there is between the effect produced by an ordinary wind storm and a tornado.

This additional energy would not be applied to air blowers in practice, unless there was thereby produced some highly desired result, which is absent when the air from the blowers is not driven in toward the axis of gyration by the restricted discharge port of the burner structure, or its equivalent.

In view of the well known destructive power of a tornado, there should be no question but that the air currents in the burners in suit do assist in the atomization of the oil, a relatively small amount, of course, when the oil pressure is from 200 to 300 pounds per sq. in. and the air pressure is only 2 to 8 inches of water pressure, as compared with the assistance which is rendered when the oil is under a lower pressure and the gaseous fluid is discharged from under a pressure of a hundred pounds per sq. in., or so.

While perfect atomization is necessary in order to secure rapid diffusion, it is only one of several means used in the attainment of this desired end.

It is immaterial by what process the "perfect atomization" may be secured, so long as the nozzle has **means for projecting a hollow cone-shaped film of oil into said furnace through said hole** (claim 7); i. e. so long as the atomized spray is spread out as over the surface of a cone, so that it may be effectually converted into a whirling cone of fuel and uniformly mixed with the air which must likewise pass "through said hole."

There is quite a variety of structures on the market by means of which oil can be atomized perfectly, so far as satisfying all the practical needs for combustion. One must therefore look beyond the question of atomization in order to show cause why burners, embodying the combination of elements set forth in the patent claims in suit, are superior to other burners. It appears evident enough, upon reflection, that the crux of the issue depends on the property of diffusion, as it was so clearly and concisely stated in the decision, adverted to on page 19, which was handed down by the Examiner-in-Chief of the United States Patent Office, on April 28, 1913.

THE PATENT CLAIMS IN SUIT APPLIED TO THE BURNERS IN SUIT.

Claim 2 of patent No. 945,873.

1. **A nozzle:** The entire burner structure shown in Figs. A, C and D.

2. **Having a restricted discharge orifice:** (19) in Figs. A and C, and (1) in Fig. D.

3. **and independent inlets for a gaseous fluid:** (5) in Figs. A. C and D.

4. **and a liquid:** the tube (2) communicating with the atomizer (12) in Figs. A and C and a similar supply tube (not shown) to the atomizer (12), the outer end of which is broken off in Fig. D.

5. **there being a passage from each of said inlets to the discharge orifice:** (18) for the air in Figs. A, C and D and (4) shown in Fig. B for the oil through the atomizer (12).

6. **said passages having a portion in common which forms a mixing chamber:** the space within the burner casing (nozzle) immediately adjacent to the restricted discharge orifice (19) in Figs. A and C and (1) in Fig. D.

7. **and each of said passages being arranged to produce a rotary motion in the fluid passing therethrough toward the discharge orifice:** In the air passage, this is accomplished by the inclined vanes (20) in Figs. A and C, and by the inclined doors (5), assisted by the inclined vanes formed at the ports through (15), in Fig. D. In the oil passage, it is accomplished by the tangential slots (13) on the end of plug (6), shown in Fig. B.

The device illustrated in patent No. 945,873 may produce a miniature tornado, the same as the device illustrated in patent No. 1,066,161, but the mixing chamber in the former device is not located to best advantage. The oil was not introduced into the whirling gaseous fluid at such a position and in such a condition as to produce the results which, it has been discovered, are attainable with the arrangement shown in the latter device.

Claim 1 of patent No. 1,066,161.

1. **A nozzle:** The mechanical atomizer (12).

2. **having a small discharge orifice:** (14).

3. **means immediately adjacent to said orifice for producing a whirling motion in a liquid fluid passing therethrough:** the tangential slots (13) in Fig. B.

4. **a casing surrounding said nozzle:** The burner structure for containing the air which passes therethrough.

5. **and having a restricted discharge port concentric with said orifice:** The circular opening marked (19) in Figs. A and C and (1) in Fig. D.

6. **and means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current:** The "gaseous fluid" here is the air which is supplied for the combustion of the oil. It is forced through the burners by means of blowers and caused to enter the port (19) in a whirling current by means of the tangential inlets (5) in Figs. A and C. In Fig. D the air is made to

whirl through the port (1) by means of the inclined doors (5), assisted by the impeller (15).

Claim 6 of patent No. 1,066,161.

1. **A furnace having an admission hole through its casing:** A portion of the front wall, or casing, of the furnace is shown in section, the admission hole being marked (19) in Figs. A and C and (1) in Fig. D.

2. **a nozzle having means for projecting a hollow cone-shaped film of oil from a round unobstructed delivery orifice into said furnace through said hole:** The nozzle (12) in Figs. A, C and D is provided with means for whirling the oil, from under a high pressure, through a small orifice, as shown in Fig. B, which causes it to take the form of a cone-shaped film upon delivery.

3. **means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil:** In Fig. A, air from the closed fire room, under a pressure of from 2 to 8 inches of water, flows through 16 ports (5) of the register (15). Vanes are formed at said ports, which direct the air so as to cause it to whirl around the atomizer (12) while likewise driving it through the film of oil inward toward the axis of gyration. In Fig. C, the air flows through 30 ports (5) tangentially into the space within the burner casing where it whirls around the atomizer (12). The conical surface within said casing leading to the discharge port (19) drives the air through the oil film inward toward the axis of gyration. In Fig. D, that part of the air flowing through the burner casing, which passes through the impeller (15), receives an intensified whirl, while likewise being driven through the oil film toward the axis of gyration.

This element causes a penetration of the oil film in all three burners shown, and produces a whirling cone of fuel.

4. **and means for supplying air into the furnace through said hole:** This element includes the means for creating a difference in pressure between the fire room and the furnace, the ports (5) and the passages within the burner casings shown in Figs. A, C and D, providing the means for controlling the air currents into the furnace.

The above analysis applies to claim 7 as well, there being added here merely the lining of refractory material for the hole through the furnace casing, the same being clearly indicated in Figs. A, C and D.

ADJUDICATION OF PATENT NO. 1,066,161 IN THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF NEW YORK.

In order to avoid any possible interference of the nature stated in Finding of Fact No. XIII, appellant amended his bill of complaint in the United States District Court for the Southern District of New York, by striking out all reference therein contained to the sale of oil burners by the Babcock & Wilcox Company to the United States.

This case was tried before Honorable Augustus N. Hand on Oct. 24 and 25, 1923, who filed his opinion on Feb. 27, 1924, dismissing the bill because the defendant did not infringe the patent. The B & W oil burner is shown as Fig. D herein.

Judge Hand held that the patent to Laing (Exhibits D-6 and D-8) necessitates an interpretation of the claims of patent No. 1,066,161, which must differ decidedly from the language in which they are clearly and concisely stated.

The Examiners-in-Chief of the United States Patent Office had this matter fully before them when they allowed said claims (Exhibit B-1, paper No. 23, last paragraph on page 4).

Certainly, Laing did not claim any such invention as is claimed in patent No. 1,066,161. If he had disclosed anything whatever in anticipation thereof, the fact remains that his disclosure was not published in the United States until Sept. 17, 1910, while the invention involved in this suit was reduced to practice during August of 1910. This circumstance was evidently overlooked by the Court.

The Babcock & Wilcox case was prosecuted *in forma pauperis* and the plaintiff had no New York representative. He had not been notified that an opinion had been filed, when he received a copy of the decree from the attorneys for the defendant, on Mar. 7, 1924, with notice that the same would be presented for settlement on March 14, and it was not until Mar. 20 that he succeeded in getting a copy of the Court's opinion.

The final decree having been signed on Mar. 14, he was unable to move for a rehearing, and he believed that his only remedy thereafter was to appeal to the United States Circuit Court of Appeals for the Second Circuit. An appeal was taken and is now pending.

It may be well to mention, in passing, that claim 2 of patent No. 945,873 in suit fully covers the structure disclosed by Laing, and the filing date by Laing was subsequent to that of the application for patent No. 945,873. It is maintained, however, that the invention of the Laing patent belongs to a different species from the invention of patent No. 1,066,161, since Laing introduces a non-whirling stratum of air where it acts as a buffer to prevent the outer whirling current of air from converting the inner film of oil into a whirling cone of fuel.

The United States District Court for the Eastern District of Pennsylvania has taken no action of any sort toward bringing to trial the other case referred to in Finding of Fact No. XIII.

FURTHER CAUSE WHY THE PETITION IN THE COURT BELOW SHOULD NOT BE DISMISSED.

The oil burner illustrated in patent No. 1,066,161 is of very simple construction. Any machinist can make one for a few dollar's worth of time and material—after having been shown how. The Big Interests showed no intention of buying from another, or of paying license fees for the right to use a device which they could make for themselves at negligable cost. They evidently decided that it would be cheaper, and therefore more desirable, to destroy any monopoly which might show signs of growing out of the patent rights.

No honorable offer to purchase these patent rights from the owner thereof was permitted for the reason that he was known to be the inventor also of a novel internal combustion engine, by means of which power could be generated at a small fraction of what it now costs when generated from the gasoline engine.

Articles appearing in the April 22, 1909 issue of "Engineering News" and other publications relative to the results obtained with two experimental engines which he had constructed and a full disclosure of the theory involved, had shown the practicability of this invention.

As a consequence, appellant has been unable to sell enough oil burners during the past 14 years to pay for his daily bread, notwithstanding the enormous demand for burners which has existed and the fact that his burner has shown decided superiority over all others, in every single competitive test which has been made on it. Moreover, he has been unable to find anyone, during this period, who has dared to assist him toward asserting his lawful rights, under the terms of the contracts accompanying said patents, and it is only at rare intervals that he has been permitted to earn money through any line of endeavor.

The consensus of opinion, therefore, which appears to have existed for a considerable time, is not in agreement with the opinion which was handed down by the Court of Claims.

Had it been thought possible to construct a device which produced the same result as is produced by that which is illustrated in patent No. 1,066,161, without infringing upon the claims thereof, no one would have taken the pains and incurred the expense necessary to prevent publicity being given to the use of such devices.

Had the device, illustrated in patent No. 1,066,161, been no better than other devices, which could be constructed without infringing the claims thereof, there would have been no occasion to bring into action such astounding methods as have been employed to prevent appellant asserting his lawful rights.

It is a costly process to excommunicate an individual from all persons, who might be persuaded to lend their support toward placing a valuable invention on the market; to institute a propaganda, which deprives one of his past friendships and prevents the formation of new ones; to maintain a system of espionage, which keeps track of all his personal movements, as well as his mail; to provide "doubles" to impersonate men of influence (including Government Officials), when he endeavors to interview them through the regulation methods of procedure; to have him arrested and imprisoned at critical times, either for the purpose of preventing him meeting men of influence on the public highway, or for the purpose of intimidating him when he sought legal action in the courts; to cause atrocities to be committed, which throw financial districts into consternation at times when there seems to be a likelihood of aid being rendered toward giving publicity to his invention, thereby intimidating others; to cause false reports to be circulated by those (including Government Officials) who have been assigned to conduct tests on devices embodying his invention; to cause parties, who did have the hardihood to aid him in his efforts to earn a livelihood to become involved in financial difficulties, labor troubles or other sources of worry, so that they would or could not render further aid; and to otherwise crush his productive powers and injure him in his efforts to establish the monopoly to which he is lawfully entitled under the terms of the contract, which was issued by the United States Patent Office.

These are facts which were not brought out in the evidence in this suit, other than in the general language of his affidavit of poverty. It is believed that they should be introduced in the evidence of this case. The acts of July 20, 1892, c. 209, 27 Stat. 252 and June 25, 1910, c. 435, 36 Stat. 866 provide the means to that end, including: "witnesses shall attend as in other cases, and the plaintiff shall have the same remedies as are provided by law in other cases."

Appellant believes that he is entitled to recover damages which he has sustained because of a broken contract, if not in accordance with the Revised Statutes, Title LX, Sec. 4919. Moreover , it seems fitting and proper that the Sovereign Citizens of the United States should be shown how certain of their public officials entice an army of men to exercise their inventive faculties and sign a contract with those who, in addition to the labor involved in producing that which is alleged to be new and useful, are willing to pay into the Treasury of the United States certain stipulated fees; while other public officials not only break the contract, when it is to their advantage to do so, but deliberately support a conspiracy to "freeze-out" the owner thereof, if he cannot be persuaded to surrender the same, should it later be discovered to be a thing having real value.

It was not until after appellant had been incarcerated for nearly three years in insane asylums, by processes which boldly violated Articles V and VI of the Amendments to the United States Constitution;after it had been demonstrated that he was effectually barred from securing his day in court, where he could learn who it was that inspired the crime of having him committed where he had to listen to unearthly noises and witness nauseating sights; after it had appeared certain that he must go through the remainder of his life branded "insane", with people having full right to say at any time that he was merely "out on a visit"; It was not until it had been clearly seen that he was a Citizen of the United States, whose rights under the common law were extremely limited, that the various parties, who are now making, using and vending oil burners, which infringe his patents, permitted descriptions of such burners to appear in the public press.

It was not until all of this had occurred that he was able to secure direct evidence of the nature of the improvement, which the United States Navy Department made during 1911 in the oil burners, which have since been installed on the boilers of all its ships.

It was not until the United States Government had clearly shown in what manner it now honors a successful inventor and how effective are the means employed to prevent people from enjoying the benefits which may follow from the legitimate use of his invention—it was not until then that the fear of an enforcement of said contracts had subsided, and, whereas people infringed secretly before, they now do so openly.

It could not possibly have been otherwise, after it had been demonstrated that the Government now holds less respect for an inventor, who has already developed an epoch-making improvement in the art of burning fuels and who stands ready to supply the crying need of the hour—cheap mechanical power—than it accords to its lowest type of criminals, who at least are permitted to face their

accusers, before being condemned to imprisonment; that the United States has become a place where an ignorant immigrant can earn a decent living, but a successful inventor, owning a valuable patent contract, has been obliged to lead the life of a pauper, since the day when the value of his invention became known, a victim of that peculiar paradox in human nature, that people hate most bitterly those whom they have injured and from which there appears to be no relief, unless the Government changes its long continued attitude of complacent indifference to his numerous appeals for the protection to which he is entitled under the law.

Appellant has been helpless for so long a time in asserting his lawful rights, that people were eventually justified in believing that he had none.

Much of this could have been prevented had appellant been provided with the means, to which he was legally entitled, for taking testimony in this case.

Appellant has at hand the best of evidence to prove that the most cunning, as well as the most atrocious schemes ever conceived have been brought into action, in order to prevent any individual from co-operating with him in his efforts to supply an effective means for conserving nature's recources, and that the Government itself has been decidedly antagonistic toward any such efforts, reserving its greatest rewards and honors for those who succeed in devising ways and means for destroying two tons of nature's resources, where only one ton was destroyed before, thereby multiplying the profits which flow unto those who usually provide the funds for campaign purposes at election times.

There is evidence available to prove that the costs of maintaining this conspiracy have been enormous; but great as have been these costs, they sink into insignificance in amount as compared with that of the losses, which the people have suffered because of it. And great as have been these financial losses, they are small when compared with the losses of honor, virility and character among people. who have been induced to support such a conspiracy.

Weak and poor indeed is any nation, that can see no injustice in such methods as employed here, to break a solemn contract, which a government entered into with one of its citizens. In any nation where there may have developed such a sense of justice, all other strengths and enormities of bullion and arsenals and warehouses can be no strength whatever, but may be quite the reverse.

It is respectfully submitted that the decree below should be reversed and the case remanded, with authority to amend the petition so as to include in the claim all compensation to which appellant is justly entitled, his power to take testimony in the original action, having been extremely limited, through no fault of his own.

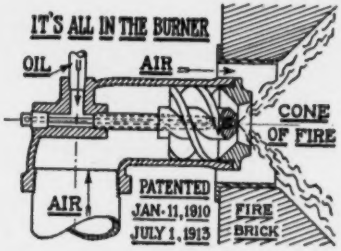
Harry B. Stilz

APPELLANT.

IT STANDS ALONE—IN A CLASS BY ITSELF

THE UNIVERSAL BURNER

The most effective means known for conserving fuel.



The instantaneous diffusion of finely-divided fuel and air here produces virtually a

A FLAMELESS FIRE.

The maximum temperature of combustion attainable with

A NON-OXIDIZING FIRE.

A soft fire of great intensity, restricted to a small space immediately adjacent to the burner, is made with

GAS, POWDERED COAL, OIL.

Nebulized fuel, projected into a miniature tornado, created by chimney draft, blower air, compressed air, or steam effects

A PHENOMENAL HEATING EFFICIENCY.

Invented and Manufactured by

H. B. STILZ

1949 N. THIRTEENTH STREET, PHILADELPHIA, PA.

LINK-BELT COMPANY

Nicetown, Philadelphia, Pa., April 1, 1912.

H. B. Stilz,
Philadelphia, Pa.

Dear Sir:—

In a recent competitive test, which we conducted in our shop, we found that the burners which we are using took 2½ times as long and 3¼ times as much oil as the Stilz burner to heat our furnaces to 2000 degrees Fahr.

We will immediately equip some of our furnaces with your burners, and if results prove as satisfactory as the test leads us to believe that they will, we will ultimately install them throughout our plant.

Yours very truly,

Link Belt Company,

(signed) *C. W. Adams,* Superintendent.

In every test, without exception, which has been conducted in every section of the United States, it was found that this burner was decidedly more efficient than the burner with which it competed.

In the cement industry, when installed on rotary kilns, this burner produced the same amount of cement clinker with 25% less oil than was required with the next best oil burner then in use. It increased the capacity of the kiln 50% and abolished ring formations within the same.

S. L. ALLEN & CO., INC.

5th St. and Glenwood Avenue

Philadelphia, March 5th, 1923.

Mr. H. B. Stilz,
Philadelphia, Pa.

Dear Sir:—

Replying to your inquiry as to performance of your No. 12½-B Oil Burner, we are pleased to state that of the many burners tried in our plant, yours displays very definitely the cleanest combustion and most uniform heating qualities.

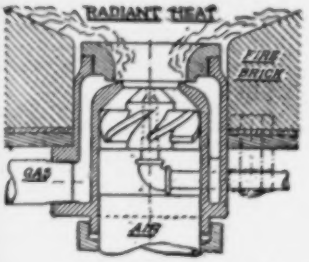
We have been very favorably impressed also with the non-oxidizing characteristics of this burner. We have accomplished a large quantity of work with your burner in a single oven furnace which all others, so far as we know, could not accomplish, except with a semi-muffle furnace, and the goods leave the furnace practically free from scale.

We are considering the application of a number of these burners to other furnaces in the near future.

Very truly yours,

S. L. Allen & Co., Inc.

(signed) *R. P. Thatcher.*



Sixty-three cents worth of Gas will do the work of a dollar's worth

With this burner, a perfect mixture of air and gas is produced wholly within the combustion chamber.

A back-fire is impossible.

UNITED GAS IMPROVEMENT COMPANY

Philadelphia, Pa., Feb. 11, 1921.

Mr. S. T. Bodine,
President.

Dear Mr. Bodine:—

Mr. H. B. Stilz has submitted to the Appliance Laboratory of the United Gas Improvement Company for test, a gas burner intended for industrial application. The Appliance Laboratory has conducted a series of tests on this Stilz Burner, using for the purpose an existing form of candy furnace. This furnace, with the burner provided for it by its maker, gave an efficiency, starting all cold, of 36.1 per cent and starting all hot, of 42 per cent. The operation was practically silent. The air pressure required for the several adjustments used, varied from 1.4 to 3.4 inches of water.

In order to secure the highest efficiency with the Stilz Burner, it is essential to provide a specially shaped fire-brick ring, upon the surface of which the fire is made to play, heating it to incandescence, so that a large part of the heat can be transmitted to the kettle by radiation, instead of by convection, as occurs with the other burner tested. We made the changes to the furnace that Mr. Stilz and we considered would so improve it for use with the Stilz Burner. These changes having been made, a test showed that the Stilz Burner gave an efficiency, under these conditions, of 57.3 per cent. when the test was started with the furnace cold, and of 61 per cent. when the test was started with the furnace hot. The air pressure was 1.7 inches of water.

These tests were made upon a 20-inch diameter copper candy pan, placed in the top of a furnace built for the purpose. The determination of efficiency was made with a water evaporation test. The operation of the furnace with the Stilz Burner was noisy.

The efficiencies are the relation of the heat conveyed to the water to the heat that the perfect combustion of the gas would develop.

We have not so far tested the Stilz Burner in connection with furnaces for purposes other than the boiling of water in a candy furnace.

With regards—

Respectfully,
(signed) *Walton Clark*, Vice-Pres.

AN OUTLINE OF FUNDAMENTALS

A burner is a piece of mechanism, by means of which a fuel is intermixed with air and combustion thereby promoted.

The term combustion is commonly accepted as referring to the process of burning, whereby a substance unites with oxygen, with the resulting production of light and heat.

Fuels may be defined as those substances which, by means of atmospheric air, can be economically burned to generate heat.

The two elements contributing most largely to the economic value of any fuel, as measured by its heating power, are carbon and hydrogen which, when burned in a sufficient supply of oxygen, are converted into carbon dioxide and water in a gaseous condition.

Although oxygen, the universal supporter of combustion, as here defined, is the most abundant of all natural substances, it never exists by itself in nature, but always in association with other substances. Thus it is that, as a constituent of atmospheric air, it is associated with the the inert gas, nitrogen; the relative proportions of the two gases in pure air remaining practically constant under all conditions, viz. 21.3% oxygen is mixed with 78.7% of nitrogen by volume.

The ultimate efficiency of a fuel should be expressed in the total amount of heat it is capable of generating. The proportion of that heat which is utilized, depends in greatest measure upon the method which is used to burn it.

The amount of air which is required to burn a given fuel is easily calculated. If less than this amount is supplied, a certain portion of the carbon passes off unconsumed and forms smoke; while a part of the remainder, being insufficiently supplied with oxygen, forms carbon monoxide, the product of incomplete combustion. If the air is supplied in excess of that necessary for perfect combustion, there is a definite loss, which is two-fold in character: First, the excess of air entering the furnace is heated by the burning fuel, thereby lowering the temperature of the mixture of gases and air below that which would prevail if the gases only were present. This reduces the rate at which heat can be transmitted to that which is being heated and tends furthermore to prevent the combustion from maintaining a kindling temperature. Second, owing to the larger volume and higher velocity, a smaller portion of the gases comes in actual contact with the heating surfaces and the time of contact therewith is shorter, so that the temperature of the mixture of the gases and air escaping to the atmosphere is higher than would be the case if there were no excess of air; while the increased volume is such that the total amount of heat thus carried away, without exerting any useful effect, is greatly increased. By way of illustration, when hydrogen and oxygen, with neither in excess, are burned, a temperature of 3,191 degrees centigrade is produced. If hydrogen is burned in air, only 2,010 degrees can be obtained, while, with 25 per cent excess of air, a temperature of but 1,700 degrees results.

To secure perfect combustion with the minimum amount of air require a uniform distribution of finely-divided fuel throughout the air.

The only natural liquid-fuel is crude petroleum, which is composed of a great number of liquid hydro-carbons of widely varying specific gravity and chemical composition.

A fuel cannot be burned in the liquid state. It must first be vaporized through the application of heat and then the vapor must be raised to the ignition temperature before its union with oxygen can be effected.

In order to secure the highest efficiency in the burning of oil it is essential: First, the oil must be converted into a vapor; second, the precise amount of air must be supplied to cause the complete oxidation of the constituent elements of the oil, and third, diffusion should be instantaneous.

When crude petroleum is heated to a degree sufficient to vaporize the heavier components thereof, there results a dissociation of some of its hydro-carbon compounds and carbon is deposited within the chamber in which the heating is effected. In order to completely burn this variety of oil in practice, therefore, it must be atomized and projected into the furnace where, because of its widely-exposed surface, it is instantly vaporized by the heat therein.

The work necessarily performed by the atomizing agent is simply the work of stretching the surface, by converting the oil, which, in bulk, has practically no surface, into a myriad of minute spheres.

There are two widely-used methods of atomizing liquids. In the first, a current of gaseous fluid is blown upon a stream of liquid in such manner as to rapidly break it up into small drops, which are carried along in the current. Devices in which this operation is performed, are known as steam or air atomizers. In the second, the liquid is given a whirling motion as it is projected through a small orifice, the resulting spray taking the form of a widely-diverging cone of extremely fine mist. Devices in which this operation is performed, are known as mechanical atomizers.

To supply the air which is required for combustion, is an equally simple operation. Three methods are in wide use: First, the air is drawn into the furnace by chimney draft; second, the air is blown into the furnace by mechanical means, and third, the air is induced into the furnace by the injector action of the burner itself, the air or steam used for atomizing purposes serving as the impelling force.

Oil atomizers and structures for controlling the air supply (air registers) are really but means to an end. They provide the means for securing rapid diffusion. And it is only by virtue of the property of diffusion that complete combustion can be effected without an excess of air.

As to the real nature of diffusion, it is known that at ordinary temperatures the particles of oxygen in the air are moving about in every conceivable direction at velocities averaging over 1,600 feet per second.

Any one molecule, however, moves only an inappreciable distance before being arrested by collision with another molecule. It therefore takes an appreciable time for a particle of oxygen to travel even a short distance. It is this time element that constitutes the great stumbling block when the attempt is made to burn a large amount of fuel in a small space.

The reason why intense combustion is easily attained with a charcoal fire is that the fuel is solid at the temperature of ignition. Being solid, it can present a large surface for the oxygen to act upon and an atom can not break away and go up the chimney without first being united with at least one atom of oxygen.

In the combustion of hydro-carbons, on the other hand, we have the following conditions: The fuel is already on its way to the chimney before it is even partially burned. The first effect of the heat is to dissociate the carbon from the hydrogen. Whether or not the latter unites with the oxygen does not affect the soot or smoke question, since the constituents and also the products of combustion of hydrogen are alike transparent gases. But in any case the carbon, left in the form of an impalpable dust, is much less favorably circumstanced than that in a charcoal fire. If it were attached to a hot coal, so as to be capable of receiving a blast of air, its combustion would be easily accomplished. But instead of this it is carried along by the current of gases, and unless it is given plenty of time before being cooled, it will be left alone as a particle of soot.

An examination of the nature of flaming leads to similar conclusions. The luminous part of a flame is caused by the white-hot particles of carbon. These particles have been robbed of the hydrogen with which they were formerly associated, and they have not yet met the oxygen necessary for complete combustion. The process of finding, or of being found by the oxygen requires time, and if perchance the temperature falls below that of ignition before the process is completed, the carbon will be deposited as soot or else go up the stack as smoke along with the excess of oxygen with which it should have been united. Thus an unmistakable symbol of the conditions that are necessary in order to burn a large amount of combustible in a small space is a short flame.

THE MECHANICAL ATOMIZING OIL BURNER.

It is only through mechanical atomization that a practically instantaneous diffusion of oil spray and air can be accomplished and, for this reason, the mechanical atomizing fuel oil burner seems destined to displace all other types.

In order to show just what takes place in a mechanical atomizer, reference is made to Fig 1, which is very similar to the United States Navy standard design. The same kind of spray may be produced by means of the somewhat simpler structure shown in Fig. 2, where the oil is forced through the grooves of a spiral, which fills the oil passage at a point immediately adjacent to the oil discharge orifice.

Oil under high pressure is delivered through the central passage in the atomizer and the transverse holes A, into the space B, which supplies four high-velocity jets through the slots C. These jets enter the space D tangentially and create a whirling current which is discharged through the orifice E. The centrifugal action of the whirling oil is reacted upon by the centripetal force exerted by the bounding surface of the orifice but the instant a particle of the oil is released from the orifice, it is no longer compelled by any force to travel in any direction other than in a straight line, which must be, in velocity and direction, the resultant of the two motions which it had while within the orifice E. * In the structure shown, every particle of oil, upon discharge, theoretically should travel forward at an angle of 30 degrees to the axis of the nozzle for the size of passages noted, so that the resulting spray would be distributed as over the surface of a cone.

Since virtually the same velocity is imparted to every particle of oil, while passing through the slots C, the nearer one approaches to the axis of rotation, the greater the number of revolutions it must make per second. The whirling stream of oil must therefore be hollow and, since the particles on the inner surface of the annular stream, while passing through E, make several times as many revolutions per second as those on the outer surface thereof, its various concentric layers are subjected to shearing and other forces, which produce a violent action, causing a myriad of minute streams to be discharged from the atomizer at very appreciably different angles to the axis. These streams are so close together at first, that they present the appearance of a continuous film, which rapidly decreases in density as the distance between the widely-diverging components increases and finally each stream itself breaks up into minute spheres, which never reunite, but bounce against one another like rubber balls.

It is with this kind of spray that one has to deal, from all mechanical atomizers, in the now-recognized meaning of the term.

The pioneer in the art of burning oil with mechanical atomization, was Louis Schutte of Philadelphia, Pa., to whom letters patent No. 391,865 were issued on October 30, 1888.

In Schutte's burner, the mechanically atomized oil is enveloped by a whirling current of air, which is left free to expand around the outside of the oil spray. There is nothing in his structure to exert an impelling force upon the whirling air in a direction toward the oil spray. The particles of oil continue on their rectilinear paths into the furnace, more or less independent of the air supply. Diffusion therefore proceeds slowly; an elongated flame is produced and complete combustion of the oil can be accomplished only when there is present an excess of air. If used for firing boilers much above their rated capacity, the large flame comes in contact with water-cooled surfaces and a part of it has its temperature lowered below the ignition point, so that smoke follows.

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* "Every body persists in its state of rest or of uniform motion in a straight line, unless it is compelled by some force to change that state."
Newton's First Law of Motion.

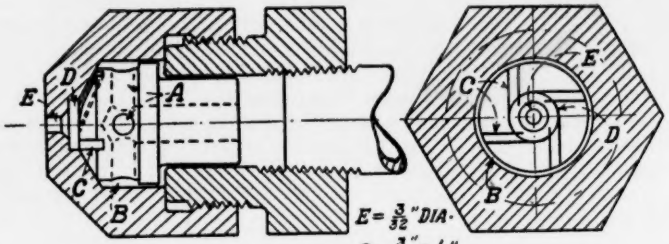


FIG. 1

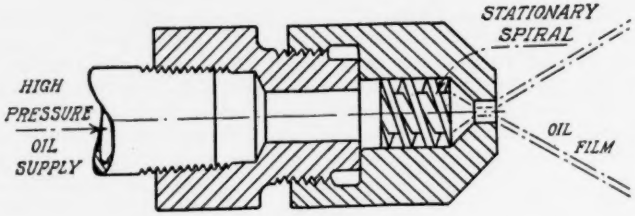


FIG. 2

U.S. PATENTS Nos 945,873 AND 1,066,161.

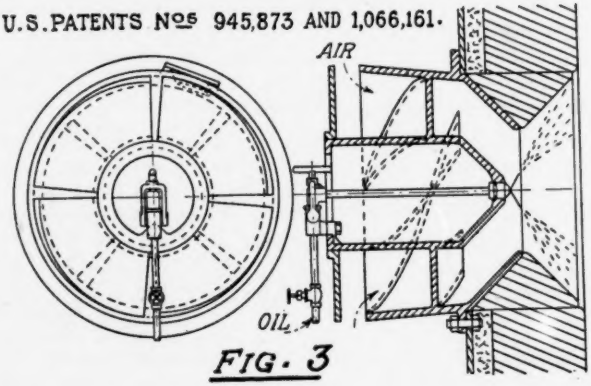


FIG. 3

THE STILZ OIL BURNER

On August 1, 1910, it was discovered that by directing a surrounding and whirling current of air more or less perpendicularly upon a cone-shaped film of oil, the air can be made to penetrate the oil film. By driving the whirling current of air in toward its axis of rotation (by means of a restricted discharge port or its mechanical equivalent) a miniature tornado is produced. ** A very violent action is therefore brought to bear upon the oil just as it is discharged from the atomizer. The resulting mixture of air and atomized oil spreads itself out in a cone-shaped current, which becomes ever more gentle as its distance from the apex increases.

By thus causing the oil film to whirl after it has been discharged from the atomizer, additional shearing stresses are created which assist in the atomization of the oil; and, what is vastly more important, the centrifugal action produces practically instantaneous diffusion of the two fluids. The fuel can be burned with short flame, no smoke and without excess of air.

The United States Government issued letters patent No. 1,066,161 under date of July 1, 1913, on this burner. Claim 1 of this patent reads:

"A nozzle having a small discharge orifice, means immediately adjacent to said orifice for producing a whirling motion in a liquid fluid passing therethrough, a casing surrounding said nozzle and having a restricted discharge port concentric with said orifice and means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current."

It specifically covers structures similar to that shown in Fig. 3, where the air for combustion may be drawn through the burner by chimney draft, in a surrounding and whirling current and directed so as to penetrate the oil film, which, being thereby converted into a whirling cone of fuel, crosses the path of and commingles with the entire mass of the air, the centrifugal action offsetting the tendency of the air current to blow the oil spray toward the axis of the burner.

Claim 7 of patent No. 1,066,161 reads:

"In combination, a furnace having an admission hole through its casing, a lining of refractory material for said hole, a nozzle having means for projecting a hollow cone-shaped film of oil into said furnace through said hole,

---

** The terrific power of a tornado is due to the fact that winds from all quarters are driven in toward the axis around which they are whirling, with accelerated rate of the girations. The energy of the huge mass of rapidly moving air, covering a very large area, therefore, becomes ever more concentrated, the nearer the currents approach their common axis of rotation.

A tornado will throw the sea in violent agitation, elevate its surface around the axis of giration, tear it apart and carry the atomized spray up to the clouds, where the refrigerating effect thereof will cause a violent precipitation, which manifests itself in a water-spout. On land, the tornado has caused the walls and roofs of closed buildings to be thrown violently outward, as though an explosion had taken place from within. Buildings have been lifted entire from their foundations and carried several rods before being dashed to pieces; while large oak trees, nearly 7 feet in girth, have been snapped across like reeds.

In clean, concentrated violence, no other storm matches the tornado.

means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil, and means for supplying air into the furnace through said hole."

It refers more specifically to the structure which is illustrated in Fig. 5, where a relatively small volume of surrounding and whirling gaseous fluid (steam) is directed so as to penetrate the cone-shaped film of oil, thereby converting it into a whirling cone of fuel which, by centrifugal action, is projected over the entire area of the admission hole to

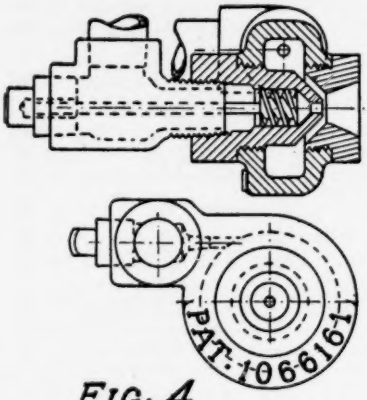


FIG. 4

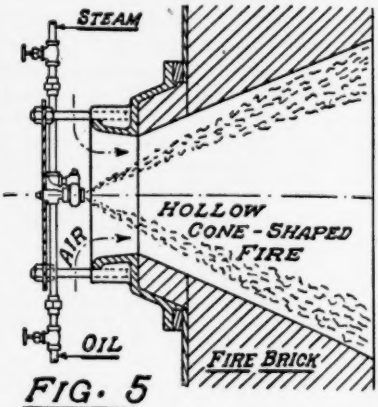


FIG. 5

the furnace and through the air which is supplied for its combustion, in precisely the same way as takes place within the restricted discharge port, which is specified in claim 1 and shown in Fig. 3.

By the doctrine of mechanical equivalents, however, each of at least four of the claims, which have been allowed in patent No. 1,066,161, cover all structures at present known by means of which a whirling spray of atomized oil can be produced under such conditions as are encountered in practice. It is the only known method for producing a whirling cone of fuel, which, by centrifugal action, will cross the path of and commingle with the air which is supplied for its combustion.

The burner, which is described in patent No. 391,865, causes two concentric streams to enter the furnace, the outer of which is composed of air and the inner one of oil spray. A burner, covered by patent No. 1,066,161, produces one ring-shaped current, composed of an intimate admixture of air and oil spray, prior to its discharge into the furnace. With the former, diffusion proceeds slowly, the mixing chamber extending throughout the entire furnace volume; with the latter, the diffusion is practically instantaneous, the mixing chamber being wholly within the burner structure, a thing apart from the furnace proper, the restricted area through the discharge port into the furnace being the place of demarcation.

PRACTICAL APPLICATIONS.

Furnaces.

With the instantaneous diffusion of finely-divided fuel throughout the entire mass of air which enters the furnace, the operator has under his absolute control the precise nature of the fire which is being produced. By admitting less air than is necessary to completely burn the fuel, the oxygen of the air quickly unites with the hydrogen component of the fuel, while the carbon component may be oxidized to carbon monoxide only, in which case the entire contents of the furnace may be filled with combustion gases, which are actively reducing in character. If more air is admitted to the furnace than is required for the combustion of the fuel, the contents of the furnace will be subjected to gases which, because of their high temperature in the presence of free oxygen, are actively oxidizing in character. The maximum temperature, of course, is produced when the combustion gases are neutral. These properties are of great importance to metallurgists and all those who are concerned with the melting, converting and heat-treating of metals.

Things can be done with the Stilz oil burner, which have to be seen in order to be believed. This burner can be pointed straight toward that which is being heated and no scale will be formed on a metal, as long as it is under the protecting cover of its fire, which takes the form of a hollow cone, the outer surface of which may be made to spread out at any angle up to 90 degrees to its axis.

This burner will eventually cause a greatly extended use of open-hearth furnaces for melting metals.

The number of heats which can be gotten out of a graphite crucible, under the action of a fire from this burner, is decidedly greater than can be obtained from any other known method of firing.

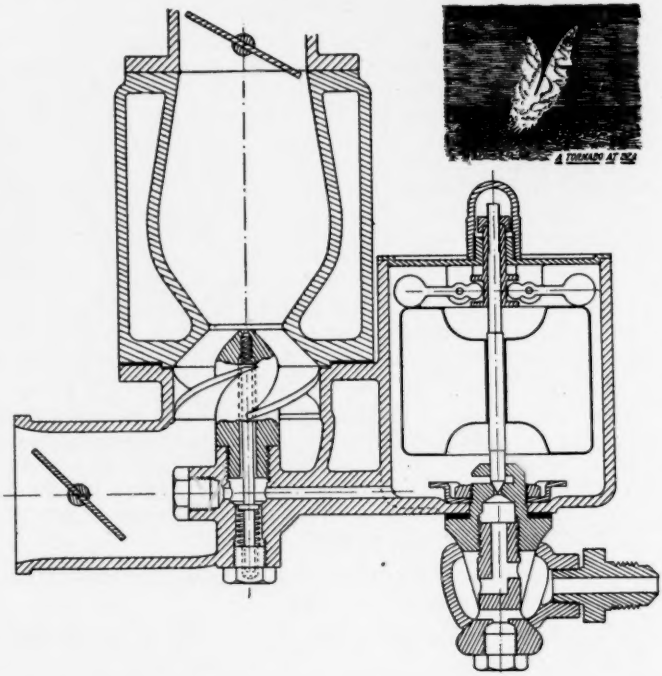
In firing boilers, it uniformly heats the furnace walls to incandescence, so that a large part of the heat is transmitted to the water by radiation. There is much less danger of boiler tubes blowing, since the flame from this burner does not impinge upon water-heating surfaces and free oxygen has been eliminated from the gases which do come in contact therewith.

A simple, cheap and efficient domestic heating equipment, embodying ths burner, should soon be ready for the market.

Gas Producers.

With means available for securing instantaneous diffusion, it will be possible to construct producers within which gas can be manufactured from powdered bituminous coal, at so low a cost that gas will ultimately displace coal for domestic heating and many other purposes. The advantages of this will be appreciated by all who have attended ordinary coal fires, or who have witnessed the hauling of coal and ashes through the streets of large cities.

THE "TORNADO" CARBURETOR



The carburetor is a most vital element in the mechanism of a gasoline engine. Although simple and cheap in itself, it extracts an appalling toll from all who use it in its present form, as is clearly indicated by the pungent odor of carbon monoxide in the wake of all automobiles. A pound of carbon, when burned to carbon dioxide, generates 14,650 heat units; when burned to carbon monoxide, it generates but 4,400 heat units.

It is the function of the carburetor to meter the most economical air-fuel mixture, at all loads and speeds of the engine; to uniformly distribute the fuel throughout the air, which is drawn into its several cylinders, and to cause a complete vaporization of the fuel before the mixture is ignited. The end in view is attained, when all of the fuel in the charge is completely burned within the engine cylinder, and when all of the oxygen in the charge can be made to enter into the combustion. The first makes for highest possible thermal efficiency at all loads, and the second for maximum power with a minimum engine weight.

The carburetor, which is illustrated above, embodies the same basic principle as has already been described. The air and gasoline are

both made to whirl through their respective restricted discharge orifices, centrifugal action producing practically instantaneous diffusion. The heavier constituents of the gasoline, which may not have been immediately vaporized, will be carried to the outer edge of the whirling current, where they will come in contact with the walls of the chamber, as shown with a jacket, so that exhaust gases from the engine may transmit heat thereto, in such quantities as will just vaporize all of the gasoline.

The speed of the engine is controlled in the usual way. The gasoline discharge orifice is made just large enough to supply the desired mixture, when operating at full load. A lean mixture is desirable at light loads. If there should be a tendency for it to become too lean, it can be rectified by causing a corresponding partial throttling through the air-intake butterfly valve, thereby causing increased suction on the gasoline nozzle.

Here one finds accurate metering, instantaneous diffusion and complete evaporation of the fuel, combined with simplicity in design and operation, in a device which bears about the same relation to other carburetors that the Stilz oil burner bears to the oil burner with which it competed in the test referred to in the Link-Belt letter shown on page 2.

A simple structure embodying this principle, for injecting fuel into a separately compressed charge of air, may revolutionize the construction of internal combustion engines, so that power may be produced at but a small fraction of its present cost. Developments along this line are already well under way.

COMPARATIVE MERITS.

Gas is the ideal fuel. The apparatus necessary to burn it is simple, cheap and efficient. The fuel is easily supplied to the consumer through underground pipes, from a reliably constant source of supply. A gas fire is very concentrated and may be readily controlled by simple automatic means, to meet the immediate needs of service. Gas can be burned anywhere with safety and, when the products of combustion are carried up a chimney, it leaves behind it nothing but heat. The use of gas is limited, however, to heating equipments which remain fixed, owing to the large space which is required to store the fuel required to develop a relatively small amount of heat.

Oil is the best fuel for use on board ships, locomotives, etc. It is easily stored. The labor in supplying it to the burners is reduced to a minimum. It occupies 34% less space and has 34% less weight than coal for an equal heat delivery. It eliminates the formation of soot, smoke, dust and ashes. Oil firing is flexible and the varying fluctuations of load can be followed instantly.

While the evaporative efficiency of a boiler, at is rated capacity, when fired with ordinary coal, is seldom above 70%, the same boiler when fired with oil, can be made to operate at three times its rated capacity and yield, at that overload, an evaporative efficiency of over 80%.

The only scientific way to burn coal is to grind it into an impalpable powder and then supply this pulverized coal through a burner where it can be intimately mixed with the air which is supplied for its combustion. In this way, boiler efficiencies and capacities on a parity with oil firing can be obtained.

When burned with the same degree of efficiency, one ton (2240 lbs. @ 13000 B. T. U.) of coal will produce about the same amount of heat as 200 gall. of oil, or 52,000 cu. ft. of manufactured gas, or 29,000 cu. ft. of natural gas.

The relative prices at which these fuels must be purchased in order to produce the same amount of heat per dollar expended are therefore about as follows:

Oil per gallon	Coal per ton	Manufactured Gas per 1000 cu. ft.	Natural Gas per 1000 cu. ft.
4 cents	$8.00	15.4 cents	27.5 cents
6 cents	12.00	23.0 cents	41.5 cents
10 cents	20.00	38.5 cents	69.0 cents

SERVICABLE DATA

The evaporation of 34.5 lbs. of water per hour from and at 212° Fahr. has been arbitrarily fixed as a boiler horse power. Water tube boilers are usually rated by allowing 10 sq. ft. of heating surface per boiler horse power. With improved combustion methods, however, it is possible to secure a good evaporative efficiency with less than 2½ sq. ft. of heating surface per boiler horse power developed.

A pound of fuel oil will produce as much heat as is required to evaporate 20 pounds of water from and at 212 deg. Fahr. The best evaporative efficiency, as reported to date from reliable sources, in oil fired boilers, is 84%.

Under ideal conditions fuels may be burned as follows:

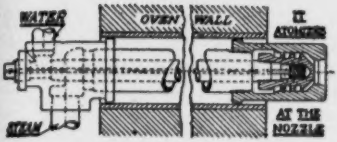
Kind of fuel	Air required	CO_2	B. T. U.
Carbon	11.3 lbs.	21.3%	14,650 per lb.
*Fuel Oil	13.3 lbs.	16.4%	19,440 per lb.
**Natural Gas	8.85 volumes	11.95%	1,000 per cu. ft.
Marsh Gas (CH_4)	16.9 lbs. or 9.4 volumes	11.9%	23,513 per lb. or 1050 per cu. ft.
Hydrogen (H_2)	33.9 lbs. or 2.35 volumes	none	62,100 per lb. or 347 per cu. ft.
†M'f'd. Gas	4.46 volumes	15.0%	558 per cu. ft.

(In the above, gases are measured at 32° Fahr. and atmospheric press.)

* Composed of 85.45% Carbon, 11.17% Hydrogen, 0.17% Sulphur, 0.23% Nitrogen and 2.98% Oxygen. 27.1 deg. Baume. Specific Gravity 0.892.

** Composed of 1.94% hydrogen, 93.85% Marsh Gas, 0.2% Olefiant Gas, 0.44% Carbon Monoxide, 0.23% Carbon Dioxide, 0.35% Oxygen, 2.98%, Nitrogen and 0.21% Hydrogen Sulphide. From St. Mary's, Ohio.

† From Philadelphia Gas Works; composed of 5.70% Carbon Dioxide, 7.45% Illuminants, 1.11% Oxygen, 20.06% Carbon Monoxide, 37.47% Hydrogen, 22.45% Marsh Gas and 5.76% Nitrogen.



Any kind of a liquid converted into a

PERFECT FOG

by highly efficient mechanical action.

For steaming bakers ovens, manufacturing powdered milk, carbonating water and many other operations where it is desirable to cause an extremely rapid action within a liquid through an exposure of a greatly expanded surface, this atomizer has no equal.

CONCLUSION.

The day seems close at hand when the now-prevailing crude and wasteful methods of burning fuels will not be tolerated.

Gas should be utilized chiefly in heating processes which are conducted on a small scale.

Oil is usually preferable where the relatively high first cost of the equipment, which is necessary to burn it economically, is more than offset by the lower cost of the fuel per heat unit developed.

Powdered coal is usually the best fuel to burn in all operations where there are very heavy demands for heat. With the aid of suitable burners, pulverized coal can be burned just like a gas. The heavy first cost of the pulverizing machinery and other equipment necessary to prepare and utilize powdered coal will soon be paid for through the greatly reduced operating expenses.

But the ideal way to distribute energy for heat, light and power is by means of electricity, and improvements in the internal combustion engine, which are even now over-due, will enable electricity to be generated at a very low cost.

The world is on the threshold of a new and wonderful era. A new culture shall be born. Other cultures have existed and passed away, because they entailed human slavery. The new culture shall endure and become universal, because huge mechanical slaves, with inexhaustible and illimitable energy, will unceasingly toil in the service of man. And this shall have been rendered possible because of the discoveries which have been made in means for producing cheap mechanical power.

MEANWHILE

Don't be misled by those who claim that combustion efficiencies depend upon furnace construction, for

It's All in the Burner!

No. [redacted] 88

October Term, [redacted] 192[redacted]

HARRY R. STILZ,

Appellant,

v.

THE UNITED STATES.

Appellant's Reply Brief.

Appeal from the Court of Claims.

HARRY R. STILZ,

Pro Se.

[redacted]

Solicitor for Appellee.

IN THE

Supreme Court of the United States,

October Term, 1924. No. 296.

HARRY B. STILZ,

Appellant,

v.

THE UNITED STATES.

APPELLANT'S REPLY BRIEF.

Appellant stated under oath that the invention set forth in Patent 1,066,161 was reduced to practice during August, 1910 (p. 2, par. 5), and that he gave notice of said patent (p. 2, par. 8). The appellee was provided with every facility for determining the truth of the above statements and never denied them, prior to the trial of the case.

In answer to paragraph 2, page 5 of appellee's brief, it has been stated and never denied that the alleged infringing burner, as well as the burner illustrated in Patent 1,066,161, projects the oil spray through the admission hole to the furnace in a whirling current, which covers the entire area of said hole. The air for combustion is likewise directed through the same admission hole where it must commingle with the oil spray. Also, in both cases the oil is atomized perfectly. Therefore, appellant's device and appellee's device both produce precisely the same result.

Controverting the statement on page 10 of appellee's brief, there has been no tornado on record where the velocity of the air current has equalled the velocity

of the "mild" current which is produced within the alleged infringing burners. In view of the well-known destructive power of a tornado (see footnote on page 41), it is contrary to all reason to assert that a myriad of minute streams of a liquid, which is projected into the stream lines of such a "tornado" as is produced within the alleged infringing burners, would not be subjected to destructive action and assistance thereby rendered in the atomization of the liquid. The small atomizer used for spraying one's throat is well known to operate successfully on a "mild" air pressure.

The test referred to on page 126, line 11, of appellee's brief does not prove anything for the reason that it was conducted in the open on a winter day. The cold blast of air from the blower upon the hot oil spray merely increased the viscosity of the oil, before the atomization was completed, sufficiently to offset the assistance which was rendered by the impact of the air stream upon the oil stream. Such a condition would not exist in practice where the radiant heat from the furnace prevents a cooling of the oil by any cold air blast which may be directed through the oil film.

In reference to the argument relative to finding XI, on page 13 of appellee's brief, there appears to be a wrong application of the law to the facts as finally found, as has been pointed out on page 20, paragraph b.

There is nothing in the record upon which to base the statement that the "film proper of liquid oil extends less than half an inch" (p. 18, l. 18, and p. 72, l. 22 of Appellee's Brief). That statement was made by one witness, while the testimony of two other witnesses was not in agreement therewith. The argument in first two paragraphs on page 39 is believed to be incontrovertible. It has never been determined how far the oil streams extend from the nozzle orifice before atomization is completed. The distance varies greatly.

The heavier streams composing the film without doubt extend a number of times farther than half an inch before breaking up into drops. And any current of air which may impinge upon these continuous streams will render some assistance in their atomization. This matter is immaterial, however, since the "hollow cone-shaped film of oil" in claims 6 and 7 in suit is not restricted to any particular condition of the oil forming the film. A mass of oil, when projected into space, may be in the form of a thin sheet having a continuous surface; it may be a thin layer composed of a myriad of minute streams spread out over a wide surface, and it may be a thin layer composed of a myriad of minute spheres. It is still a film in all three cases. There is no possibility of penetrating a film of oil having a continuous surface by means of either steam or air. The film must first be disrupted, the penetration proceeding through the space between the subdivided particles thereof.

Appellee, for some unknown reason, emphasizes the fact that surrounding the mechanical atomizer (12) and fastened to it ("screwed into or otherwise secured") so as to form a part of the complete atomizer, is a casing (17) in Figs. 3 and 4 of Patent 1,066,161 (p. 35, l. 8; p. 38, l. 11; p. 47, l. 3; p. 68, l. 26, and p. 69, l. 9 of its Brief). Certainly the mechanical atomizers of the alleged infringing burners are fastened to the air registers, which form part of the burner casings. The two elements are fastened together in either case. The burner casing in Figs. 3-4 is small because the gaseous fluid which passes therethrough is from under a high pressure and there is therefore needed but a small volume of it to supply the energy necessary to convert the oil spray into a whirling cone of fuel. The burner casings in Figs. A, C and D (pp. 21 and 22) are large because the gaseous fluid which passes therethrough is from under a low pressure and there

must therefore be a large volume of it to do the same amount of work in producing the whirling cone of fuel. It is easily seen that the only real difference between Figs. 3-4 and Fig. C is due to the foregoing fact. For a given size of mechanical atomizer, the former has a small casing with but one inlet, while the latter has a very large casing with thirty inlets.

There appears to be nothing in claims 6 and 7 in suit to prevent the "means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil" and the "means for supplying air into the furnace" from being embodied in one and the same element of the burner structure, as is perfectly feasible when low pressure air is used to penetrate the oil film.

In view of the fact that the air passing through the burner shown in Fig. C is directed upon the cone-shaped film of oil in tornado stream lines, with their associated destructive effect, Fig. C also clearly shows an "actual, integral and unitary atomizing nozzle structure."

The emphasized paragraph on page 56 of appellee's brief would imply that infringement could be avoided by merely closing the air openings (5) surrounding the burner shown in Patent 1,066,161, substituting therefor either increased pressure on the air which flows through the burner casing (17) or a larger casing, so that sufficient air could be supplied therethrough to support combustion, notwithstanding the fact that the element for supplying this air for combustion is specified in claims 6 and 7 as (any) "means."

The statement at the bottom of page 53 of appellee's brief is false, because Schutte's burner casing does not lead to a restricted discharge port; he does not direct his whirling air so as to penetrate his oil film,

as was decided in the Patent Office and as appellant has pointed out at the bottom of pages 39 and 42 and in the first paragraph on page 26.

The Court's attention is invited to the figure which appears on page 33 and to the copy of the same and description thereof which, as will be seen in Exhibit B-1, was filed in the United States Patent Office before any of the claims of Patent 1,066,161 had been allowed. The patent claims in suit cover the burner shown in said figure just as explicitly as they cover the burner which is illustrated in Patent 1,066,161. Certainly the Patent Office made a grievous error in allowing these claims, if they must be so construed as to read on the one design of burner only and not upon the other, which was also filed with the application and which falls just as precisely within the stated claims. It will be readily seen that the burner illustrated on page 33 would be almost identical with Schutte's burner, had Schutte merely added to his structure a restricted discharge port. The appellee uses this restricted discharge port, therefore "Appellee's structures are substantially the same and operate on the same principle as" the burner which is illustrated on page 33.

The appellee inserts a quotation at the bottom of pages 90 and 92 of its brief, which is taken from paper No. 23 of Exhibit B-1. The statement was made in reference to a patent to Schutte, No. 759,320, which is not part of the record. Under cover of a name, the appellee endeavors to lead the Court to believe that this statement referred to Exhibit C-2.

In answer to the argument advanced on page 94 of appellee's brief: The mechanical atomizer (12) of Patent 1,066,161 will, under like conditions and by itself alone, produce precisely the same degree of atomization as is produced by the mechanical atomizers forming part of the alleged infringing burners. The steam passing through the casing (17) increases the de-

gree of atomization—it assists the mechanical atomizer—but the "tornado" developed within appellee's structures likewise assists in the atomization (see par. 3, p. 26). The chief function of the gaseous fluid in either case, however, is to convert the oil spray into a whirling cone of fuel (see bottom of p. 26).

In reference to the quotation found at the top of page 96 of appellee's brief: It requires the violent action of the "tornado," produced by driving the surrounding and whirling gas toward its axis of gyration, to penetrate the oil film, assist in the atomization of the oil and convert it into a whirling cone of fuel. Schutte and all the other inventors of the prior art merely whirled the air around the outside of the mechanically atomized oil spray where it remained in greatest measure. The violent action was lacking; the oil film was not penetrated, the air did not cross the path of the oil and thereby assist in its atomization and no whirling cone of fuel was produced.

The only reference cited on page 97 of appellee's brief, in which the air is whirled through a restricted discharge port, is Laing, and his disclosure has no bearing upon the present action for reasons stated on page 29, paragraphs 3 and 6.

The appellee has wandered far afield in its efforts to prove invalidity.

Armstrong does not anticipate for reasons stated on page 23. Kermode does not so much as embody a mechanical atomizer in his structure. His "scraper" (15′) merely separates the oil into two streams which may reunite upon discharge. At best they can but continue as two slightly diverging streams. He shows no means whatever for producing a hollow cone-shaped film of oil. Anthony shows nothing which functions like Patent 1,066,161, and even though he had his patent was not published until 1912.

Effective arguments against the other patents cited to prove anticipation will be found in Exhibit B-1.

That the patent claims in suit read upon and literally cover the appellee's burners is undeniable. The appellee has drawn up a very lengthy brief and cited 100 authorities, to read all of which would be an equally arduous task. A huge "smoke screen" has been produced behind which to conceal the fact that there is no evidence whatever to prove that anyone had ever before constructed a device by means of which "a whirling liquid cone of fuel is projected through a surrounding and whirling gaseous mass." By way of contrast the examiners-in-chief of the Patent Office needed only fifteen words to say what the invention of Patent 1,066,161 was and only ninety-four words to state why appellant is entitled to a monopoly of all structures which are covered by the claims thereof.

In the appeal referred to on page 29, the United States Circuit Court of Appeals for the Second Circuit affirmed the decision of the lower Court. Being confronted by the fact that the District Court had stated no valid grounds upon which to dismiss the bill of complaint, the Circuit Court arrived at the same conclusion in another way, holding that "the invention is limited strictly on the face of the patent to the structures shown in the drawings."

It being evident, however, that the Patent Office had not so decided and being unable to show any error in the original decision allowing the very broad claims, because no one had ever before devised any structure by means of which "a whirling liquid cone of fuel is projected through a surrounding and whirling gaseous mass," the Circuit Court supported its opinion that there was no infringement by contending that "the appellant is obliged to designate different parts of appellee's structure to meet the same elements in the

different claims. . . . He argues that the impeller plate (15) is the equivalent of a casing having a restricted discharge port. Notwithstanding the existence and use of both the impeller plate and the cone (3) in appellee's device, as the appellant argues, the impeller plate (15) is the equivalent of casing (3) in appellee's structure."

The structure referred to is shown as Fig. D, page 22. As stated on page 27, in reference to claim 1 of Patent 1,066,161, the "casing surrounding said nozzle and having a restricted discharge port" is the burner structure for containing the air which passes therethrough, the restricted discharge port being marked (1) in the figure. The "means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current" is stated to be the inclined doors (5) assisted by the impeller (15).

In reference to claim 6 (p. 28), the "means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil" is the impeller plate (15) which gives to the air which passes therethrough an intensified whirl as it is being driven inward toward the axis of gyration, so as to penetrate said film of oil by means of the conical surface leading to the restricted discharge port (1).

In both claims 1 and 6, therefore, it is the impeller plate (15) which is the principal element for creating the whirling stream of air, which is the more effective in penetrating the oil film, and it is the casing having the restricted discharge port, which drives this whirling stream inward toward the axis, so as to cause the penetration of the oil, the two together being necessary to produce the desired result, *viz.*, the production of a whirling cone of fuel, which, by centrifugal action, is projected through the surrounding and whirling air, which enters the furnace between the periphery

of the impeller plate and the casing wall, this space being primarily the "means for supplying air into the furnace through said hole."

From the above it would appear that the Circuit Court erred in reaching the conclusion, which led it to affirm the decree of the District Court, as should have been seen from the argument contained within appellant's reply brief therein, which is, in part, as follows:

> "In giving consideration to claims 6 and 7, it is well to bear in mind that the defendant makes a double use of plaintiff's invention. The primary function of the air, which passes through the impeller plate (15), is to penetrate the oil film, this current being applied with intense whirl near the point where it will be most effective in converting the oil into a whirling cone of fuel. Secondarily, this impeller plate supplies some air for the combustion of the oil. The primary function of the current which flows between the periphery of the impeller plate (15) and the casing (3) is to supply the air necessary to burn the oil. Secondarily, this air is directed in a whirling current so as to penetrate the oil film, in order to support the centrifugal action, which causes the oil spray to be projected through the air. In applying claims 6 and 7 to the burner in suit, plaintiff gave consideration merely to the respective primary functions.
>
> "If the impeller plate (15) were made large enough to fill the casing (3), it would resemble (Fig. A, p. 21 herein) and the patent claims in suit would still read on the structure. If the openings in the impeller plate (15) were closed, the burner would still be an infringement of the patent in suit (see Fig. C, p. 21 herein). The same basic principle of penetrating the cone-shaped film of oil and converting it into a whirling cone of fuel is found in these two cases as well as in the defendant's combination of the two within one structure.

"Fig. D illustrates the action which takes place within the burner in suit. The oil film is shown in yellow, the air which passes through the impeller plate (15) in blue and the air which passes through the space between the periphery of the impeller plate (15) and the casing (3) is shown in red.

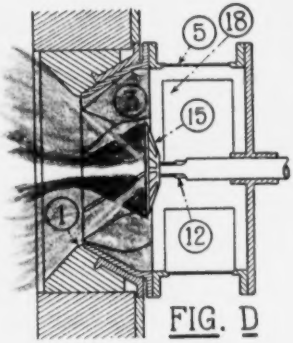


FIG. D

"It is true, as the defendant contends, that 'the air which passes through the impeller blade . . . would tend to fly outward.' But it cannot, because of the restricted discharge port (1), the mass of the air flowing between (3) and (15) acting as a wall which carries this restriction to a point immediately adjacent to the impeller blade.

"Therefore, the impeller plate (15) is the equivalent of a casing having a restricted discharge port, in combination with tangential inlets, provided there is a conical surface leading to a restricted discharge port behind the impeller plate, which directly or indirectly drives the air which passes through the impeller plate toward its axis of rotation."

The Circuit Court asserted that "it is the atomizing of the oil that the inventor is chiefly interested in," notwithstanding the decision of the Examiners-in-Chief of the Patent Office and the following argument, which appears in appellant's reply brief therein:

> "The combinations of elements, which are set forth in the patent claims in suit, broadly cover the only known means for producing instantaneous diffusion in the combustion of fuels. And exceeding great are the advantages of combustion processes, where diffusion is instantaneous,

over those processess which were known in the prior art.

"In furnaces, such as are used for heating metals, where a very high temperature and relatively small amount of heat is transmitted to the material being heated, this improvement manifests itself primarily in a very great reduction in the amcunt of fuel consumed, as indicated in the Link-Belt letter (see p. 34 herein).

"In boiler furnaces, where the chief end in view is the transmission of great quantities of heat to water, the temperature of which is in the neighborhood of 400 deg. Fahr., this improvement manifests itself primarily in a great increase of the boiler's capacity to generate steam.

"A mechanically atomized spray of oil, when projected into a miniature tornado, at its very axis of gyration, produces a much more intimate contact and distribution than can be produced by any other known means. Increased economy of combustion follows, due to a more energetic combination of oxygen and fuel. The intensity of the fire is increased, its temperature is higher, more heat is radiated to the exposed boiler surfaces, and more is taken up by the gases. The heating surfaces of a boiler are also more efficient, because there is a greater difference in the temperature of the water surface and the fire surface of the plates forming the heating surfaces. As the rate of transfer of heat varies as the difference in the temperature of the water on one side of the plate and that of the fuel gases on the other side, the greater this difference, the greater the amount of heat which will pass through a unit of heating surface in a given time. Moreover, large quantities of heat are transmitted to the water by direct radiation from the incandescent walls of the furnace itself.

"One of the requisites of economy, therefore, is high temperature in the furnace. This, on the other hand, means a small supply of air, but an amount which is sufficient to support combustion. To secure perfect combustion with a small amount of air requires an intimate distribution of air and fuel. There must also be a high relative velocity between the air stream and the fuel stream, in order that each particle of combustible may be brought into actual contact with the required number of molecules of oxygen to completely burn it in the shortest possible time.

"That is why the defendants use the restricted discharge port (1); that is why they use the impeller plate (15), which causes the air to penetrate the oil film and converts it into a whirling cone of fuel. They require a high relative velocity between the particles of fuel and the particles of air, and a structure, which will bring the respective particles together in a definite way, in order to produce the results now obtainable.

"The power required to operate the air blowers here is more than offset by the increased evaporative efficiency of the boiler, which is caused by the high velocity of the air currents, which the blowers produce. Moreover, by utilizing the invention of the patent in suit, the defendants are now able to evaporate as much water in one boiler as was evaporated in two boilers before, and at a higher evaporative efficiency. This permits boiler houses to be reduced to half their former size, and more power can be produced therein with the same amount of fuel. It would be difficult to overestimate the importance of this circumstance in connection with boiler installations on board ship."

The Circuit Court's decision, that the patent in suit was not infringed, was reached only by absolutely ignoring every argument which appellant advanced in

his briefs and every statement which he made as an expert witness at the trial. Moreover, the Court ignored all statements found in the patent specification dealing specifically with the invention which is claimed therein, quoting only those parts, which serve rather as a mere background, upon which the invention itself could be depicted. More deplorable still, the Circuit Court, like the District Court and the Court of Claims, absolutely ignored and virtually reversed a most important decision on the question at issue, which was handed down by what is perhaps the most expert board of judges on patent law in existence—the Examiners-in-Chief of the United States Patent Office. And finally, without having found any cause why the patent claims in suit should not have been allowed, or why they do not read explicitly upon the alleged infringing oil burners, it was necessary to hold that these claims do not mean what the language used to express them conveys; that there must be substituted for each of the generic terms embodied in these claims a corresponding specific element, which happens to be described in the specification.

In view of the above, it is submitted that the judgment of the United States Circuit Court of Appeals for the Second Circuit, like that of the Court of Claims, is erroneous, without legal justification and contrary to all the rules, decisions and principles of law laid down by this Honorable Court and found upon the statute books applicable to such causes.

Appellant submits that he has shown a clear case of infringement. Had he been able to take testimony to show the results of tests on his oil burner and the methods used to prevent him from selling the same, after its superiority had been fully demonstrated, particularly the manner in which officials in the service of the United States had forestalled his efforts to reap

his lawful reward under the terms of the contract which was issued to him under the seal of the United States Patent Office, he believes that his claim for compensation would be doubly impressive. If this evidence were fully disclosed, it would show the United States to be in a hitherto-unheard-of inequitable position. The statutes provide the means for according full justice in all the United States Courts, even to pauper litigants. But full justice is not attainable to one who has not the means for taking all the testimony which is relevant to prove his case.

No effort has anywhere been made to show that the patent claims in suit do not read upon and literally cover the alleged infringing devices. The Court of Claims merely relegated these claims to the margin and held that appellant was not entitled under the law to claim anything beyond the indentic device which is illustrated in patent 1,066,161. The United States District Court for the Southern District of New York held that there was no infringement because the Laing patent, which had not been published at the time when the invention of the patent in suit had been reduced to practice, necessitated that an unwarranted construction be placed upon the patent claims in suit. The United States Circuit Court of Appeals for the Second Circuit was not very specific in giving its reason why there was no infringement. Evidently it was based upon the contention that the patent claims in suit were restricted in some unseen manner solely to an improvement in the art of atomizing liquids.

Appellant first devoted his inventive faculties to the art of burning oil just prior to 1905. His first patent was issued to him on September 19, 1905. It was not until August 1, 1910, however, that he succeeded in discovering an improvement, for which he felt justified in expending the time and money necessary to place

it upon the market. His efforts to obtain a patent on the latter improvement were opposed by the examiner of his application, who contended that, if any invention at all was disclosed, it was confined to the identic device as illustrated.

Appellant maintained that he had discovered a new principle in the art of burning fuels and appealed his case to the Examiners-in-Chief of the United States Patent Office, who held that his claims were allowable, "there being in the prior art, as it is revealed by the examiner, no construction in which a whirling liquid cone of fuel is projected through a surrounding and whirling gaseous mass." The language used by the Examiners-in-Chief is most clear and concise and no evidence has yet been produced to show that they had erred in their decision. The Court below simply avoided it.

Firmly believing in the efficacy of a contract which is issued under the seal of the United States Patent Office, appellant devoted years of effort, at immeasurable personal sacrifice, to establish a business manufacturing and selling things for which he believed he possessed a lawful monopoly. If the decision of the lower Court is affirmed, it would appear that all his past efforts have been worse than wasted; that his contract is of no avail, and what are perhaps the broadest claims ever allowed in a patent for oil burners, are void of any meaning. He does not feel that he has been justly treated, when there has been shown in no case any cause why these very broad claims should not have been allowed, especially when it has been conceded by the defendants' witnesses that, in the alleged infringing burners, "a whirling liquid cone of fuel is projected through a surrounding and whirling gaseous mass."

Appellant feels that he should not be thus penalized because he prosecuted his cases before the courts *in forma pauperis* and without legal aid, where it appears from the opinions handed down that he was not considered competent to argue as an expert in his own behalf and where he was not provided with the means for obtaining testimony from others in his favor, even though the statutes make full provisions to that end.

Respectfully submitted,

HARRY B. STILZ,
Appellant.

IN THE

Supreme Court of the United States.

October Term, 1925. No. 38.

HARRY B. STILZ,
Appellant,
v.
THE UNITED STATES.

Appeal from the Court of Claims.

PETITION FOR A REHEARING AND MOTION TO REMAND TO COURT OF CLAIMS FOR A FURTHER FINDING OF FACT.

To the Honorable the Chief Justice and Associated Justices of the Supreme Court of the United States:

Your petitioner, Harry B. Stilz, respectfully represents that:

1. He brought this action, under the Act of Congress approved July 1, 1918, c. 114, 40 Stat. 705 to recover compensation for the use and manufacture by or for the Navy Department, of certain oil burners alleged to infringe Patents 945873 and 1066161. The Court of Claims adjudged that he was not entitled to recover.

2. On November 16, 1925, this Court held that as no infringement was found, the facts are not sufficient to constitute a cause of action and affirmed the judgment of the Court of Claims.

3. This action was prosecuted *in forma pauperis*, but appellant was not provided with the means for taking testimony of witnesses favorable to him.

4. Under the Acts of Congress approved July 20, 1892, (c. 209, 27 Stat. 252) and June 25, 1910 (c. 435, 36 Stat. 866), the means is provided for according full justice to any citizen of the United States, no matter how poor he may be, if he is entitled to a trial in a Federal Court.

5. This action went to trial upon the testimony of witnesses, all of whom were employed by the United States; the judgment of the Court of Claims was founded upon *ex parte* testimony.

6. The only expert opinion in evidence, which was favorable to appellant—the opinion of the Examiners-in-Chief of the United States Patent Office, on the strength of which the very broad claims, which appear in Patent 1066161, were allowed—was discarded by the trial Court.

7. The appellee has never argued that the patent claims in suit do not read upon and literally cover the alleged infringing oil burners in suit.

8. The Court of Claims did not hold that the patent claims in suit should not have been allowed; it held that "the plaintiff's claims to invention may not under the law be accorded a wider scope than the bringing into existence of . . . this identic device as improved."

9. As appears in Exhibit B-1, the Patent Office Examiner of the application for Patent 1066161 refused to allow any of the claims submitted; he held that the applicant had not invented anything beyond the identic device which is illustrated in said patent.

The Examiners-in-Chief of the United States Patent Office held that the applicant had discovered a new principle in the art of burning fuel and that he was entitled under the law to his very broad claims to invention, as they appear in said patent.

10. The Court of Claims held that, in comparing the oil burner which is illustrated in Patent 1066161 with other oil burners in which the oil is atomized principally by mechanical means, "the fundamental principles of differentiation are obvious and elementary."

11. The plaintiff was enabled to place in evidence but a very small part of the available facts which are competent to prove his claim. The trial Court did not have an opportunity to see through the show of things, as it was presented by the defendant's witnesses, into the thing itself, as it might have been revealed had the plaintiff possessed means for taking a full line of testimony.

WHEREFORE your petitioner prays for a rehearing of this action and he moves to remand the same to the Court of Claims for a further finding of fact.

HARRY B. STILZ,
Petitioner.

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ment at time of filing appellant's petition, precludes appellant from recovery from the Government for the use of such devices, and should have prevented his bringing or prosecution of this appeal; and of itself warrants its dismissal, so far as it involves patent No. 1,066,161 and the devices alleged to be covered thereby. And the finding of fact of the Court of Claims that such suit so pending is sufficient basis for its conclusion of law dismissing the petition_ 112
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In the accompanying illustrations, which are mostly in section, the parts relating to the oil supply, and especially for the mechanical atomization of the oil, are colored green.

Those relating to the utilization of steam or other gaseous medium for that atomization are colored red.

Those relating to admission of air for combustion are colored blue.

Yellow represents refractory material.

Brown represents oil.

In the drawings of the appellant's patents, the appellee's devices, and the structures illustrating the prior art the parts having the same function are given the same color.

In the Supreme Court of the United States

OCTOBER TERM, 1924

HARRY B. STILZ, APPELLANT
v.
THE UNITED STATES
No. 296

CHRONOLOGICAL SYNOPSIS OF PRINCIPAL POINTS OF THE FINDINGS OF FACT

From 1900 to 1905 Mr. Stilz, the appellant, was an employe of the Government in the Bureau of Construction and Repair of the Navy Department. (Finding I, p. 3, Trans. of Rec.)

From 1905 to 1911 he was at various times in the employ of the United States Navy Yards at Philadelphia, Pennsylvania, and Mare Island, California. During such employment his duty and work included the examination, designing, and making of drawings relating to oil burners or oil-burning devices for oil-heated furnaces, and he had access to the various drawings, blue prints, and publications relating to such devices at the places where he was employed. (Finding I, pp. 3–4, Trans. of Rec.)

November 18, 1908, Mr. Stilz filed an application for patent on an improvement in oil burners. (Finding II, p. 4.)

January 11, 1910, this issued as a patent No. 945873, and is one of the patents in suit. (Finding II, p. 4.)

May 8, 1911, Mr. Stilz, while in the employ of the United States, filed an application for improvement in oil burners. (Finding III, p. 4.)

July 1, 1913, this issued as a patent No. 1066161, and is the other patent in suit. (Finding III, p. 4.)

February 16, 1922, Mr. Stilz filed petition in the Court of Claims, at which time there were pending in the United States District Courts for the Southern District of New York and the Eastern District of Pennsylvania, respectively:

> Suits by him against the Babcock and Wilcox Company of New York City and the Schutte and Koerting Company and the Bethlehem Shipbuilding Corporation of Philadelphia, Pennsylvania, for an injunction against each of the defendants in said suits and an accounting by them for profits for alleged infringement by them of the plaintiff's said letters patent No. 1066161 in the manufacture and sale by them of certain oil burners, some of which were alleged to have been sold to the United States Navy for installation and use on naval vessels of the United States. (Finding XIII, p. 9.)

February 14, 1922, the above suit against the Babcock and Wilcox Company was still pending. (Finding XIII, p. 9.)

January 22, 1923, the suit against the Schutte and Koerting Company and the Bethlehem Shipbuilding Corporation was still pending. (Finding XIII, p. 9.)

So far as appears the suit against the Schutte and Koerting Company and the Bethlehem Shipbuilding Company is still pending.

BRIEF FOR APPELLEE

ERRORS IN APPELLANT'S BRIEF

The brief filed for appellant contains very many statements and matters wholly irrelevant and improper; and which are not only unsupported by the Findings of Fact, but quite contrary to them.

Lest, by failing to refer to them here, we should seem to acquiesce in them, we take this opportunity to comment briefly on some of the most apparent before proceeding to discuss the appellee's position.

On page 18 of his brief appellant alleges identity of function of the device of his patent 1066161 and the burners in suit (appellee's burners). This has no foundation, in fact, and is denied, and is indeed contrary to the Findings of Fact IV, VII, and IX, where it is clearly shown that the devices shown in the patents in suit are " steam atomizers " relying on the function of steam or other gaseous fluid as an atomizing agent (Finding IX), whereas the devices alleged to infringe use no such medium, and rely purely on " mechanical " means; that is to say, the

> projection into the furnaces under heavy pressure through spiral passages in the nozzle end of the burner * * * no steam, air or other gaseous fluid was introduced into or used in the burner proper for any purpose nor used with any part of the equipment for the atomization of the oil, etc. (Finding VII.)

In the last paragraph, at the bottom of page 18 of appellant's brief he says:

> The discovery which is disclosed in patent 1,066,161 was made during August, 1910,

and refers to paragraph V on page 2 of the transcript of record to substantiate the statement. But this reference is to a mere allegation of the petition which was not proved later by the evidence. The date of invention or discovery of the alleged invention must be presumed to be the date of filing of the application for the patent—in the absence of proof of an earlier date. This date, according to Finding of Fact III, was May 8, 1911—when appellant was in the employ of the United States. This is further admitted in paragraph 2 on page 19 of his brief.

The assumptions and conclusions on page 19, paragraphs 4 and 5, are unwarranted and contrary to the findings, and the statement is misleading. That appellant discovered a new principle in the art of burning fuels is disproven by the prior art (set out in Findings V and VI) particularly by

the British patents to Armstrong, the British and American patents to Kermode and the American patent to Lee, some of which, by the way, were not before the Board of Examiners in Chief when it allowed the claims; and the claim that the monopoly which appellant alleges was granted to him extends to defendant's devices, because of his inference that the latter operate on the new principle which he unjustifiably claims to have invented, is opposed to the Findings of Fact IV, VII, and IX.

The latter part of paragraph 5, page 19 of appellant's brief, specifying what constitutes the "Novelty" of his invention, is entirely unjustified and contrary to the fact and the Findings. Neither do his claims show nor does his invention "consist in the production of the whirling cone of fuel which by centrifugal action is projected through the *air which is supplied for its combustion.*" But on the contrary, according to Finding IX, page 8—

> The oil leaving the inner orifice in a conical film or spray is struck by the rotating *steam before it passes through the outer orifice 19* (of the atomizer casing 17), which *steam* aids in the atomization of the oil. (Italics and parenthesis ours.)

the air for *combustion* having no such function (Finding IX). But if appellant's contention as to what constitutes the "*novelty*" of his invention be true, he has pronounced his own doom, for the

prior art mentioned in Finding VI clearly shows the same construction and function, as was pointed out in the opinion of the court below, page 13, transcript of record. See also page 101 hereof.

Appellant's statement on page 19 that the " invention in suit is basic in so far as a hollow cone-shaped spray of liquid is penetrated by a surrounding and whirling gaseous mass " is unfounded. It is an attempted expansion of his claim beyond the limitation of the only invention, if any there be, that is set out in the specification of his patent; it is disproved by the opinion of the Court, pages 13 and 14, and the showings in the prior art as set out in Findings V and VI, particularly the Armstrong patent; and if it were true it is immaterial, since Finding XI is conclusive on the point that none of the devices of appellant's patents has been manufactured or used by the defendant or that his patents have been infringed by defendant.

On p. 20 appellant gives a list of alleged " Errors in the decree of the Court of Claims." The criticism of the understanding of the invention and the law by that Court is not impressive after a reading of the very careful and extended statement in the Findings and Opinion.

As to paragraph (d) in this list of errors, it is pointed out that the allegation of notice made in the claimant's petition was not supported by the proof, as shown by finding XII.

The last paragraph on page 20, alleging the infringement of the patents in suit on the ground that

the defendant's structures " very clearly embody all of the elements which are set forth in said claim," is, of course, in toto, opposed to the Finding and is a mere conclusion of appellant. (Findings VII and XI.)

On page 21 of his brief, appellant has reproduced certain drawings illustrating in general defendant's structures, and has numbered their various parts with the numerals used in his patents in suit to identify other and different parts, in the endeavor to identify the parts shown in the figures of the patents having specific functions, with parts of the defendant's structures shown in the brief having *different* functions so as to make them appear the same. For example, the numeral 19 in the patent 1,066,161 is the orifice of a casing 17 which closely surrounds the oil nozzle 12 and forms an integral part of the complete atomizer 1. In the figures A and B of the brief showing Appellees structures, he gives the same numeral to the large aperture in the furnace itself in the effort to show that the whole register of the figures A, B, and C corresponds to the specific integral casing 17 of the patent, and that the large aperture opening into the furnace from the register is the same as the opening 19 into the register from his casing 17. To make the inconsistency more apparent, attention is invited to figure 1 of the drawing of his patent (p. 11 transcript of record), where the aperture to the *furnace* is given the numeral 8 instead of 19, though in this instance the apertures are identical and should be given the same number to be consistent.

In this connection attention is further invited to page 8 of the Appendix to the appellant's brief where, at the bottom of the page, he has introduced a wholly imaginary structure so far as appears from any evidence in the case, apparently prepared for the purpose of showing the assumed similarity of defendant's structures with that of the patent in suit, and has marked the figure "U. S. patents Nos. 945873 and 1066161," which are the numbers of the patents in suit.

Appellant is entirely unjustified in his description on page 22 of his brief of the defendant's structure illustrated in Fig. C, page 21, where he says the "conical surface within the burner casing leading to the restricted discharge port 19, drives the whirling current of air in towards its axis of rotation, thereby causing it to penetrate the oil film."

This is misleading and false. Misleading, since the opening from the register shell into the furnace of the figure is by appellant numbered 19, evidently for the purpose of an attempt to identify it with the restricted orifice of the integral casing 17 of his patent as pointed out above, which casing is an *integral part of his atomizer*. As a matter of fact, this opening which he has marked 19 in Fig. C is nothing more or less than the opening 8 of his patent, Fig. 1, found on page 11 of the transcript of record, and *does not perform the function of 19 of his patent*. It is false, since it does not drive

the whirling current of air in towards its axis of rotation "thereby causing it to penetrate the oil *film.*" This is an *ex parte* expert argument, having no foundation in the record, contrary to the evidence, and opposed to the Finding of Fact VII. This finding shows that in Appellee's structures the oil issues from the nozzle in a cone-shaped *film* of liquid oil (not spray) which *almost immediately* develops into a fine spray. The air introduced only for combustion entering through the register and *outside* of the nozzle mixes with this *spray,* but has no atomizing effect and *does not penetrate the film of liquid oil.*

On page 23 of appellant's brief, in the last paragraph of his discussion of the oil burner illustrated in patent 1,066,161, occurs another of the many misleading statements and false conclusions. Especially that the patent claims in suit broadly cover all constructions which effectually accomplish the result specified, and that such result had never before been accomplished. The Findings V and VI refer to many devices and patents which do just this, and Finding IX clearly defines the limitations of the claims as embodied in the patent's specific structures.

On pages 22 and 23 of his brief appellant has selected certain points of *apparent* similarity in construction and operation between his devices and defendant's structures, and by specious argument and unjustified inference has sought to show identity or equivalence, but has slurred over the

specific features and functions of his alleged invention on which his claims are based, and *on which only* they were allowed, which specific features and functions are not present in defendant's structures and his statements and conclusions are thus contrary to the findings and opinion of the court below (Findings VII and X).

Another instance where the theoretical contentions of the appellant in the court below are advanced here without warrant from the record is the assertion (p. 26) that the Government's structures embody the principle of appellant's invention, because "the air currents in the burners in suit do assist in the atomization of the oil." This is not a true statement of the functions even of the patent in suit, and certainly is not true of the defendant's burners, which perform no such function. Appellant's contention may not be advanced on this record. On the contrary, the question clearly has been decided and is concluded by the finding of fact that in defendant's burners "no steam, air or other gaseous fluid was introduced into or used * * * with any part of the equipment for the atomization of the oil" (Finding VII) and by the Finding of Fact XI, that the defendant does not infringe.

The entire discussion of the history of oil atomization; the function and results of appellant's specific devices and the comparison of defendant's devices with appellant's patents and the patents of the prior art abounds in statements, many of which

find no foundation in the record, are properly matters of expert opinion, and many of which we can not accept, but are contrary to the Findings of the court below. Particularly on pages 27–28, the entire comparison of defendant's structures with appellant's patent claims in the endeavor to show that dissimilar parts of the one correspond to specific elements of the other, is opposed to Finding XI, and is an unjustifiable expansion and forcing of the language of the claims to include the defendant's structures.

The discussion of the adjudication of the patent 1066161 in the District Court in New York, found on page 29, seems irrelevant, but at least shows the attitude of another forum in full harmony with the Findings of the Court of Claims. It may be added that the appeal from the decision of this court to which appellant refers, has been since decided, affirming in full the decision of the District Court; and is printed herewith as an appendix, it not having yet been published in the Federal Reporter.

The matter on pages 29 to 33, inclusive, relating to ill treatment and persecution are not before this court. It is admitted on page 31 that the facts referred to are not brought out in evidence.

Finally appellant throughout devotes much more space and attention to his own unsuccessful contentions in the court below than he does to the record which that court has certified on this appeal. Thus

he prints as an appendix, beginning after page 32 of his brief, a circular apparently intended for the trade and an advertisement of his burner, showing structures differing from his patent drawings but marked with the numbers and dates of his patents, and containing discussions of principles of oil burning, advertising puffs, and general statements which are not and should not be in evidence or in the record, and are irrelevant on this appeal.

BRIEF OUTLINE OF CASE

This is an appeal from the decision of the Court of Claims in a suit brought under the Act of July 1, 1918 (40 Stat. 705), amending Act of June 25, 1910 (36 Stat. 851), to recover compensation for the alleged unauthorized manufacture and use of the United States of devices claimed to be covered by claim 2 of patent No. 945,873, dated January 11, 1910, and claims 1, 6, and 7 of patent No. 1,066,161, both granted to Harry B. Stilz, the appellant herein, for oil burners.

The court below dismissed the petition on the ground of non-user and non-infringement.

The patentee is the appellant.

Appellant attempts to expand a ruling of the Board of Examiners-in-Chief of the Patent Office, into a broad interpretation of the claims of patent 1066161 on which infringement by the United States is by him concluded; and to oppose that ruling to the Findings and opinion of the Court of Claims on the question of the scope of the claims and the fact of infringement.

And an attempt is further made to show the United States and the Navy Department in an inequitable position, as acquiring benefit from the appellant for which they seek to avoid making compensation, whereas as a matter of fact the Government has obtained nothing from the appellant. Its present burners are embodiments of the teachings of the prior art existing before the alleged invention of appellant, and were in principle and in practically identical form in use in Government vessels not only before the patent chiefly relied upon was issued, but before it was invented, according to the evidence and findings of the court below.

THE APPELLEE'S CONTENTIONS

1. There is no arguable question of law, the determination of which could lead to the reversal of the judgment below, in view of the Finding of Fact (XI) that defendant does not use any of the devices of plaintiff's patents in suit, and that no such devices were manufactured for it, and that said patents were not infringed by the defendant.

2. The patents in suit are of limited scope and can not be expanded beyond the reasonable language and meaning of the claims as governed and explained by the description of the real invention, if any, and as shown in the drawings of the patents; must be limited to the actual novelty of the disclosure of the patent application, irrespective of the form of the claims as finally granted (*Eclipse Bicycle Co.* v. *Farrow*, 199 U. S. 581);

and can not include and cover what was known to the public through printed publications before the date of the patentee's invention, and what the Government used before that time.

3. When properly construed the patents in suit are not infringed by the Government.

4. The patents in suit are void because they do not show invention and are anticipated by the prior act.

5. The court below found as a fact that the plaintiff had failed to show that he gave notice required by Section 4900 of the U. S. Revised Statutes as to the devices of his patents being patented, or that he at any time during the alleged infringement of said patents for which recovery is sought by him notified the defendant of such alleged infringement. (Finding XII.)

6. The court below found as a fact that the plaintiff while in the employ of the United States filed his application for patent No. 1066161, one of the patents in suit, and the one chiefly, if not solely, relied on by him to establish his claim for compensation for its infringement. (Finding III.) There is nothing in the case to show that invention antidated filing, which is therefore the presumptive date of invention. The Act of 1918 (40 Stat. 705) under which this suit was brought, in its third proviso denies the application of the act to such a patentee.

7. The court below found as a fact that at the time of the filing of his petition in that court, there

were pending in two different District Courts of the United States, suits againt other parties for an injunction and accounting for profits for the alleged infringement of his patent No. 1066161 in the manufacture and sale by them of certain oil burners which were alleged to have been sold to the United States Navy for installation and use on naval vessels of the United States, and that at the time of the decision, December 17, 1923, it did not appear that either suit had been dismissed or otherwise disposed of in said courts. (Finding XIII). Section 154 of the Judicial Code (R. S. 1067) prohibits the the filing or prosecution in the Court of Claims, or in this court, on appeal therefrom, of such a claim for which the claimant has pending in any other court, a suit against any person, who, at the time when the cause of action alleged therein arose, was in respect thereto acting or professing to act mediately or immediately under the authority of the United States.

FIRST

There is no arguable question of law, the determination of which could lead to the reversal of the judgment below, in view of the finding of fact (XI) that defendant does not use any of the devices of plaintiff's patents in suit, and that no such devices were manufactured for it, and that said patents were not infringed by the defendant.

The court below has found (Finding XI) that defendant does not manufacture or use any of the devices of plaintiff's patent and that they have not been infringed.

This is a finding of fact.

U. S. v. *Anciens Etablissements, etc.*, 224 U. S. 309, 322.

The finding was made after exhaustive survey of the prior art, the consideration of expert and other evidence as to the structure and operation of the respective devices in a highly technical art, and a study of the claims of plaintiff's patents in view of that evidence. The contentions of plaintiff were all before the lower court and were duly considered in reaching its conclusion. The evidence on which that conclusion was founded is absent from the record here except that of patents and publications. There is not therefore before this court the material on consideration of which alone a contrary conclusion might be reached.

This court has refused, under such circumstances, to disturb the finding of the lower court.

Battin v. *Taggart*, 17 How, 74, 84.

Tucker v. *Spalding*, 13 Wall. 453, 455.

Keokuk & Hamilton Bridge Co. v. *U. S.*, 260 U. S. 125, 126.

Union Pac. Ry. Co. v. *U. S.*, 116 U. S. 154, 157.

See also Walker on Patents, Sec. 540, P. 598.

As this Court said in *Union Pacific Railway Co.* v. *United States*, supra,

> an appeal brings up for review only the decisions of that Court (Court of Claims) upon

questions of law arising in the course of the trial or in the application of the law to the facts as finally found.

SECOND

The patents in suit are of limited scope and can not be expanded beyond the reasonable language and meaning of the claims as governed and explained by the description of the real invention, if any, and as shown in the drawings of the patents; must be limited to the actual novelty of the disclosure of the patent application, irrespective of the form of the claims as finally granted (Eclipse Bicycle Co. v Farrow, 199 U .S. 581); and can not include and cover what was known to the public through printed publications before the date of the patentee's invention, and which the Government used before that time.

A

The construction of oil burners; the two types, steam atomizers and mechanical atomizers; the development of these types.

In the successful burning of oil for fuel, two problems are presented—

(a) The atomization of the oil—that is, its reduction from the form of *liquid* to that of a spray or fog, in which latter form it may be properly mixed with air for combustion.

(b) The supply of the proper amount of air in the proper manner and at the proper point to mix with this *already atomized oil spray* so that it may be rapidly and efficiently consumed.

The characteristics tending to solve these problems are inherent in all devices which accomplish with varying degrees of success the object desired.

There were at the time plaintiff filed his application two ways and two general types of structures for accomplishment of the first problem which differed chiefly in the method of and means for atomization of the oil; these methods were carried out by structures which were generally known and referred to as, in the one instance, " mechanical atomizers," and in the other " steam atomizers," although air under pressure could be used in place of steam if desired.

In the first type, the mechanically atomizing burner, the oil was atomized by purely mechanical means by being projected under great pressure from the oil aperture of the burner in a whirling cone-shaped film, which almost immediately developed into a fine spray (as a matter of fact the cone or *film* proper of *liquid oil* extends less than half an inch; the size of this may seem a small matter, but it has a very real importance in the differentiation between the operation of the appellant's and the appellee's devices, as will hereinafter appear); the second problem was solved by admitting air for *combustion only* through a surrounding air register, which air became more or less intimately intermixed with the large cone of oil *spray* (as distinguished from the small cone or *film* of liquid oil) before its entry into the furnace.

In the second type, the so-called steam atomizing burner, there was a combination with the stream of oil, *while yet within the atomizing nozzle of the burner proper,* of a stream of steam, or of air or

other gaseous fluid under pressure, for the *purpose of aiding in the atomization of the oil,* the necessary additional air for combustion being admitted through a register and intermixed with the oil *spray,* as in the case of the mechanically atomizing burner. (Finding IV.)

Practically the universal manner of constructing steam or air atomizers is to form a " casing " or cover *immediately* surrounding the oil aperture, and physically and structurally an integral part of the burner nozzle or atomizer proper, which " casing " leaves a small, narrow, confined space or mixing chamber in the nozzle, into which the oil enters, and into which the steam or air under great pressure also enters, and within the confines of which the steam or air under great pressure and high velocity is—because of the shape, size, and situation of this " casing " mixing chamber—forced into the *film of liquid oil* immediately upon the latter's entry into the mixing chamber of the nozzle. The steam or air thus has a rupturing or explosive effect upon the small *conical film of liquid oil* at its *apex,* and tears it apart, breaking it up into small drops and forming a " spray," which is carried along with the steam out of the restricted aperture of the " casing " of the nozzle and so through the outside register, in the form of a cone of spray or fog, where it further mixes with the additional air for combustion, but *without further atomization*—and so into the furnace. (See illustrations opposite pages 73, 85, 104, 105, 106, and 107.)

Thus it will be seen, on comparison of these two methods and structures, that in a mechanical atomizer the whirling action of the oil itself tends to break up or atomize the oil into a spray by its own centrifugal motion upon issuing from the oil orifice, without the assistance of any other agent such as steam or air; while in the steam atomizer it is the rupturing or explosive effect of the violently rotating steam or other gas under pressure as it impinges upon and penetrates the small cone or *film* of *liquid oil* at its *apex* as it issues from the oil nozzle and *inside* the *mixing chamber* of the *nozzle* formed by the integral surrounding " casing " of the burner proper.

Both forms of burners supply, through a separate register, additional air for combustion of the already atomized oil *spray* before its entry into the furnace.

It is to be noted that the problems of, first, the atomization of the oil, and second, the supply of air in the proper manner, at the proper point, and in the proper quantity for the sole purpose of securing efficient combustion of the already atomized oil, are entirely separate and distinct, though both must be solved in every burner installation, whether it be of the mechanical or steam type; and further that the supply of air for combustion is *additional* and supplementary to the air or steam used as an atomizer in the steam atomizers.

In brief, it is repeated that the difference between steam and mechanical atomizers lies in the

fact that the former utilize steam, air, or other gaseous medium introduced under great pressure and velocity into the *atomizer structure or nozzle itself,* to accomplish or assist in the atomization of the oil; while the latter do *not* utilize such medium, relying on the pressure and centrifugal motion of the whirling oil alone to accomplish that atomization.

The appellant's atomizers are essentially steam atomizers; the appellee's are as essentially mechanical atomizers. While it is true that appellants' atomizers may, if desired, be operated without steam or other gaseous medium and as mechanical atomizers, that is not their primary purpose, *and when so operated they are then indentical with the mechanical atomizers of the prior art in every detail, and embody no trace of novelty whatsoever.*

Examples of MECHANICAL ATOMIZERS are shown in the exhibits of the prior art referred to and forming a part of the findings of fact V and VI, notably:

Exhibit C–1, British patent No. 2,414, to Norton and Hawksley, Aug. 22, 1867.

Exhibit C–2, U. S. patent to Schutte, No. 391,365, Oct. 30, 1888, application filed Nov. 5, 1887.

Exhibit C–4, British patent to Rusden and Eeles, July 25, 1896; application Sept. 25, 1895.

Exhibit C–10, United States naval report, "Liquid Fuel," published in 1904, pages 321 to 331, inclusive.

Exhibit C–13, British patent to Meyer, No. 10,326, Jan. 24, 1907, application filed May 2, 1906.

Exhibit C–15, Blue print of drawing of Bureau of Steam Engineering, Navy Department, Washington, D. C., Jan. 6, 1908, No. "11–Y–130," sheet 1.

Exhibit C–16, Publication "Engineering," London, England, of June 19, 1908, pages 805 to 808.

Exhibit C–17, Photographic copy of drawing No. "11–Y–139" Department of Steam Engineering, navy yard, Norfolk, Va.

Exhibit D–1, French patent to Corneuve, No. 396,292, application filed Oct. 29, 1908, delivered Jan. 22, 1909; published Apr. 26, 1909.

Exhibit D–4, French patent to Normand, No. 396,955; application filed Dec. 1, 1908; delivered Feb. 9, 1909; published Apr. 26, 1909.

Exhibit D–5, British patent to Bevis, No. 20,653, Oct. 1, 1909, application filed Oct. 1, 1908.

Exhibit D–6, British patent to Laing, No. 15,747, Aug. 3, 1910, application filed July 6, 1909.

Exhibit D–7, U. S. patent to Normand, No. 1,020,048, March 12, 1912, application filed Nov. 11, 1909.

Exhibit D–8, U. S. patent to Laing, No. 1,025,279, May 7, 1912, application filed Feb. 16, 1910.

Examples of STEAM ATOMIZERS in the prior art are shown in the following Exhibits referred to and made a part of the findings of fact V and VI:

Exhibit C–3, U. S. patent to Chaney and Wires No. 481,088, Aug. 16, 1892, application filed Jan. 12, 1892.

Exhibit C–4, British patent to Rusden and Eeles, No. 17,938, July 25, 1896, application filed Sept. 25, 1895.

Exhibit C–5, U. S. patent to Moore, No. 584,951, June 22, 1897, application filed Nov. 21, 1896.

Exhibit C–6, U. S. patent to Chelimsky, No. 629,338, July 25, 1899, application filed Nov. 29, 1898.

Exhibit C–7, U. S. patent to Billow, No. 630,-320, Aug. 8, 1899, application filed June 28, 1898.

Exhibit C–8, U. S. patent to Kermode, No. 648,340, Dec. 5, 1899, application filed Dec. 5, 1898.

Exhibit C–9, British patent to Carr, No. 24,-021, Oct. 22, 1903, application filed Nov. 3, 1902.

Exhibit C–10, U. S. naval report, "Liquid Fuel," published in 1904, pages 77 and 268.

Exhibit C–11, British patent to Kermode, No. 15,269, July 8, 1905, application filed July 8, 1904.

Exhibit C–12, British patent to Armstrong, No. 3,089, Jan. 19, 1905, application filed Feb. 8, 1904.

Exhibit C–14, U. S. patent to Lee, No. 903,-736, Nov. 10 1908, application filed Aug. 15, 1907.

Exhibit D–2, French patent to Pages, No. 396,476, application filed Oct. 29, 1908, delivered Jan 28, 1909, published Apr. 13, 1909.

Exhibit D–3, Blue print of drawing No. "A643" by Schutte & Korting Co., Philadelphia.

Exhibit D–9, U. S. patent to Anthony, No. 1,023,707, Apr. 16, 1912, application filed June 1, 1910.

So many of these Exhibits of both types as are necessary to illustrate the prior art will be found reproduced in later portions of this brief.

B

Interpretation and Scope of the Patents in Suit. Analysis of patents in suit and their claims. Scope shown by phraseology of patents themselves; by applicant's own statements in proceedings in Patent Office; by applicant's distinguishing from prior art; by decision of Board of Examiners in Chief; by applicant's real gift to public; attitude of court of appeals for second circuit on scope of patent 1066161.

APPELLANT'S CONTENTION

Appellant contends that claim 2 of his patent No. 945873, relied on here, may be considered a genus claim, which broadly covers the defendant's structures, though he admits that " the device which is described in said patent, however, has no bearing

on the question at issue herein, since it belongs to a different species from the burners in suit." (Appellant's brief, p. 18, 3d paragraph.)

It is not clear how a claim which is based upon a description of a specific device, and must, on all the principles of the law of patents, be interpreted and limited, but not expanded by that description—can be a genus claim covering broadly an alleged infringing device, when the device described in the claim is *admitted* to be of a "different species" and to "have no bearing upon the question" of infringement at issue.

This patent will be fully discussed in this brief, although it is but little relied on by appellant, who has not included it in the other two suits against manufacturers who supplied to the appellee certain of the burners complained of. In the present appeal appellant contents himself with citing (p. 27, appellant's brief) certain merely surface resemblances between the elements of claim 2 and structures of appellee's burners.

Appellant's main reliance is on his later patent, 1066161, and the discussion of his brief is in the main devoted to that patent.

Appellant contends that patent No. 1066161 "is basic in so far as a hollow cone-shaped spray of liquid is penetrated by a surrounding and whirling gaseous mass." (Appellant's brief, p. 19.)

To reach this conclusion he contends that his claims may be expanded beyond the clear limita-

tions prescribed by the description and drawings of his patents in view of the prior art, to cover devices *omitting* his structural peculiarities and operating on an entirely different principle—because the language of his claims if read alone might appear to read on such devices.

APPELLEE'S CONTENTION

Beside the fallacy of this proposition as a matter of law, there is the further fallacy of fact subtly suggested—that is that his alleged invention discloses such a principle at all. These fallacies we shall endeavor to overcome in the following discussion in which we shall contend that appellant's patents show that his claims must be limited to those features of novelty not before known and shown in the prior art, but which are particularly illustrated and defined in his specification on which his claims are based.

Appellant's patents are clearly limited to an oil-burning apparatus in which one of the essential elements is a unitary or integral structure, comprising a nozzle having *in itself* independent inlets for a gaseous fluid and a liquid, and a mixing chamber common to both fluids located *in said unitary structure and a part thereof;* the whole unitary structure comprising merely an atomizer, and *as such,* distinct from and wholly unrelated to any means for supplying additional air for combustion. Any broader interpretation is impossible in view of the

prior art and the patentee's own admissions in his prosecution of the applications before the Patent Office; and with so broad an interpretation it is believed that the patents are invalid because clearly anticipated, as will be later shown.

If there be any patentable invention whatever disclosed in either of the patents in suit, it lies only in the particular combination of peculiar elements, specifically grouped and relatively located each to each, employing certain media and forces and performing definite functions, as set forth and described in the specifications and drawings of the patents; and the claims must be limited to such constructions and arrangements, which employ such media and forces, and perform such functions. See discussion in *Walker on Patents,* 5th Ed., Sec. 186, beginning on page 250, and decisions of this court there cited.

The inventions are not pioneer or generic inventions, but lie wholly in an adaptation of old and well-known devices, and differ from the latter, if at all, only in the *degree* of effectiveness, accomplished chiefly by variation in size of parts, but not in principle of operation. They can not therefore be given a broad interpretation by virtue of the doctrine of equivalents, but must be narrowly construed.

Appellant is at most a mere improver of other inventors' machines; hence is not entitled to such a construction of his patents as will cover the ma-

chines of still later inventors who have also improved on the original machines in a substantially different manner, or those who have merely utilized what was well known in the art.

Appellant's patents must be construed in the light of the prior art, and the more fully that art discloses the device subsequently adopted by him—the more narrowly must his claims and alleged invention be construed to cover only such novel features of form and construction as are clearly distinguished from what has gone before. (See *Walker on Patents*, 5th Ed., p. 245, and cases there cited.)

This principle is elemental and needs no discussion; it is set forth or applied in the following cases among many others:

Wright v. *Yuengling*, 155 U. S. 47;
Singer v. *Cramer*, 192 U. S. 265;
Boyd v. *Janesville*, 158 U. S. 260;
Kokomo v. *Kitselman*, 189 U. S. 8;
Union v. *Diamond*, 162 Fed. 148;
Clark v. *Willimantic*, 140 U. S. 481, 492;
Gordon v. *Warder*, 150 U. S. 47, 54;
Duff v. *Sterling*, 107 U. S. 636;
Westinghouse v. *Power-Brake*, 170 U. S. 561.

This court's decisions have been interpreted by Judge Coxe, in *Kennedy Mfg. Co.* v. *J. L. Molt Works*, 137 Fed. 431, at page 434, who said, in substance, that where it is shown that the field of invention was exceedingly narrow when the patentee

entered it, his claim, if it is to be upheld at all, must be limited to the feature described and shown; citing *Pomace Holder Co.* v. *Ferguson,* 119 U. S. 335; *Mast Foos Co.* v. *Stover,* 177 U. S. 485; *Miller* v. *Eagle Co.,* 151 U. S. 186, 207; *Kokomo Fence Co.* v. *Kitselman,* 189 U. S. 8.

This case is especially pertinent in view of the appellant's contention that his claims cover broadly appellee's separate air register through which a relatively mild current of air for combustion only, enters and mixes with the already mechanically atomized oil in the form of a large cone of spray—on the false reasoning that the combustion air register is an equivalent of his specific steam atomizing "casing" which the patent illustrates and describes as being integral with and forming a part of his atomizer nozzle proper, and in which casing steam *violently* impinges upon and atomizes the small conical film of *liquid oil* at its *apex* before it issues as a spray into the register, thus transforming it into that spray.

See also:

Gordon v. *Warder,* 150 U. S. 47, 54;
Duff v. *Sterling,* 107 U. S. 636;
Newton v. *Furst,* 119 U. S. 373;
Miller v. *Eagle,* 151 U. S. 186;
Knapp v. *Morse,* 150 U. S. 221.

Therefore, to discover just what the scope of the alleged invention really is we must consider the facts bearing on the issue of the patents, the language of the specifications as illustrated by the

drawings, and what was disclosed in the prior art which was presumably known to the applicant. (*Duer* v. *Gorbin*, 149 U. S. 216.)

ANALYSIS OF THE STILZ PATENTS IN SUIT

PATENT NO. 945873, DATED JANUARY 11, 1910 (EXHIBIT A).

For convenience, copies of Figs. 1 and 2 of this patent are here shown opposite page 30.

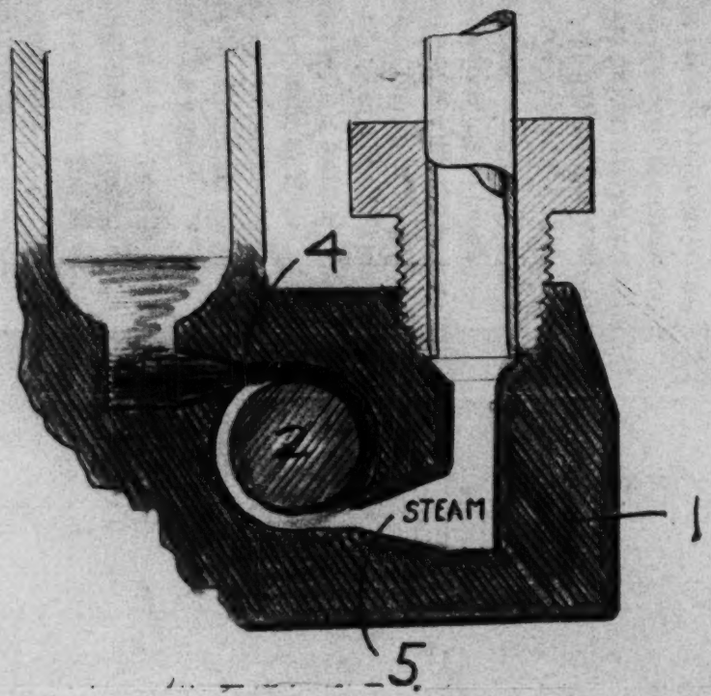
This patent describes and illustrates a *steam atomizer* which is capable of atomizing the oil, either mechanically or partly mechanically and partly with the assistance of some atomizing agent, such as steam, or substantially entirely by some such atomizing agency. The oil is whirled by entering a passage (4) placed tangentially to the axis of a chamber containing the conical plug (2), so that, if under any considerable pressure, it will enter this chamber with a relatively high velocity and whirl about the inside of the chamber with a rapid rotary motion. This chamber formed between the conical plug (2) and the inside surface of the outer casing (1) (see especially Fig. 2), is a shallow *restricted* passageway *confining* and *directing* both the oil and the steam, which enters at 5, so as to accomplish an intimate mixture of both, and *atomization of the oil inside the atomizer and before emerging from the orifice* (3). As a result, when oil alone is permitted to flow through the apparatus, it will flow out of the orifice (3) with a rapid rotation and will immediately form into a

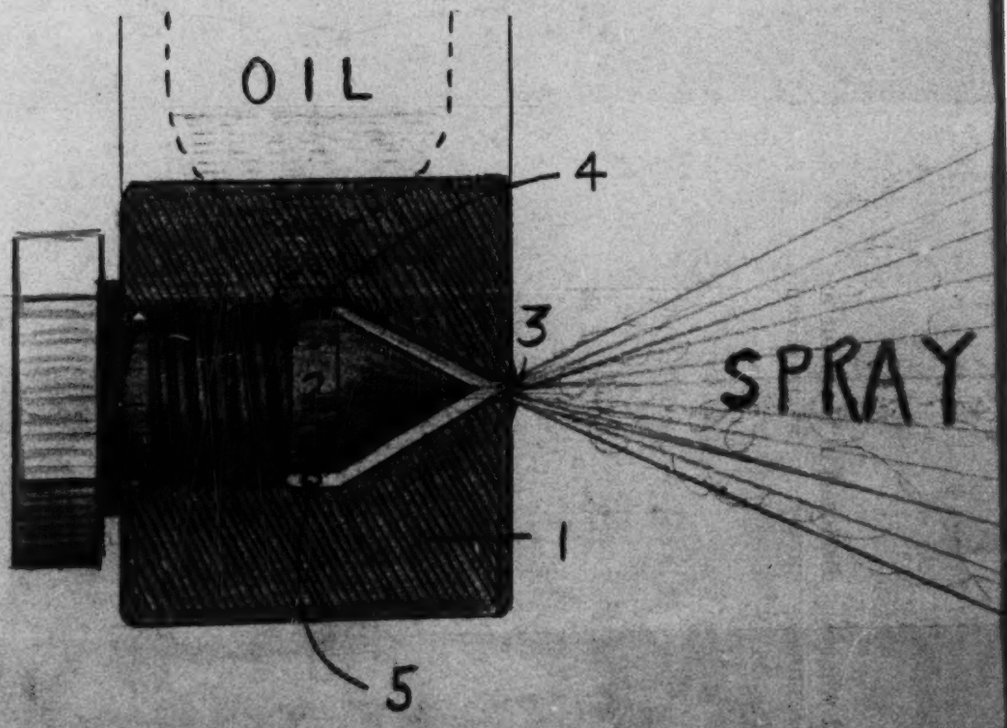
STILZ PATENT 945873.

Jan. -11-1910

Ex. A.

Fig. 1.





STILZ
945873.
Ex. A.

Fig. 2.

conical oil *film*, which will shortly break into a cone of oil *spray*, as is common with all mechanical atomizers in which the oil is rotated in this manner.

When steam is admitted through the passage (5) (see Fig. 1)—which is also placed tangentially with respect to the axis of the conical plug (2)—into the same chamber into which the oil flows, it immediately causes a mixture of the oil and steam to rotate at a very high velocity in the *inside* of the chamber, which velocity increases as the mixture flows toward the restricted orifice. The oil is thus finely *atomized by the steam before issuing from the orifice 3*, and flows in a widely diverging cone of oil *spray* along with the steam. When steam is so employed for the purpose of atomization of the oil, the method is substantially the same as that shown in the patent to Armstrong (Exhibit C–12), Kermode (Exhibits C–8 and C–11), Lee (Exhibit C–14), Anthony (Exhibit D–9) and in the French patent to Pages (Exhibit D–2), all of which are steam atomizers, and the patent to Pages refers to things stated to be well known in the art before its issue.

If, on the other hand, steam is not used for the purpose of atomization and that atomization is obtained mechanically and is due to the pressure of the oil alone, then the operation of the device would be identically the same as shown in many of the patents in the prior art already referred to as mechanical atomizers. (See pp. 21–22 hereof.)

In fact, the patent itself disclaims novelty for such mechanical atomizer. The specification states, on page 1, lines 32–39:

> Nozzles of the centrifugal type which deliver a jet having a high rate of rotation as well as a rectilinear velocity cause the issuing fluid to be atomized to such an extent that when operating in conjunction with an ample supply of air into a furnace with established high temperature complete combustion is effected.

This passage clearly is describing a structure known in the art and known to the inventor when the application was filed, such as is shown in patents to Schutte (Exhibit C–2), Bevis (Exhibit D–5), Meyer (Exhibit C–13), Norfolk test (Exhibit C–17), Normand (Exhibits D–4 and D–7), and many others.

ANALYSIS OF CLAIM 2

This claim, the only claim of this patent relied upon in this suit, is for a device comprising the following elements and characteristics:

1. A nozzle having a restricted discharge orifice. (The nozzle being (1) and the discharge orifice being (3) of Fig. 2.)

2. Independent inlets for a gaseous fluid and a liquid, there being a passage from each of said inlets to the discharge orifice (the inlets being (5) and (4), respectively, in the nozzle itself, and the " passages " being the single annular conical space

between the outer casing (1) and the plug (2) of the nozzle).

3. Said "passages" having a portion in common which forms a mixing chamber (the annular conical space in the nozzle, which is common to both inlets and forms a mixing chamber in the nozzle for the two fluids).

4. Each of said passages being arranged to produce a rotary motion in the fluid passing therethrough toward the discharge orifice (the tangential arrangement of the inlets (5) and (4) in the nozzle).

This claim is for a mere atomizing nozzle, and *specifies* and is *limited* to a unitary structure having independent inlets for *both a gaseous fluid and a liquid fuel.* These passages have a common mixing chamber and each of them enters the chamber tangentially for the purpose of causing a rotary motion in the fluid passing through it. This claim, of course, would not apply to a structure *in which* there were *not* provided passages for the use of *steam* or other *gaseous* fluid. In other words, the ordinary mechanical atomizing nozzle in which the atomization is caused purely and simply by the centrifugal force set up in the oil, due to its rapid rotation, would not have an inlet for a gaseous fluid, nor would it have a mixing chamber wherein the oil and the gaseous fluid would be mixed, and such a structure would clearly be without the terms of claim 2, which, we may interject here, *is the case*

with all of appellee's structures. It is to be noted that this atomizer shown in this patent No. 945,873 in suit is used in conjunction with an additional air register adapted to supply and control the admission of air for combustion into a furnace, which is an old device well known and many times illustrated in the prior art and almost universally used in connection with the atomizer, whether used as a steam atomizer or mechanical atomizer.

PATENT NO. 1,066,161 JULY 1, 1913 (EXHIBIT B).

For convenience, copies of Figs. 3 and 4 of this patent are here shown and will be found opposite page 34.

This patent discloses an oil burner provided with an oil atomizer which may be operated to atomize the oil mechanically, or which may be operated to atomize the oil partly mechanically and partly by means of an atomizing agent, such as steam or compressed air, or may be operated so as to substantially entirely atomize the oil by means of some atomizing agent. There is shown in Fig. 1 of the patent (not here reproduced), in connection with the atomizing nozzle a circular register provided with holes for the admission of air for combustion around the atomizing nozzle. Referring to Figs. 3 and 4, annexed, the atomizing nozzle is shown to consist of a plug (12) into which the oil flows through a pipe (9). The interior of this plug forms a chamber, the forward end of which is of conical shape and has a restricted orifice (14).

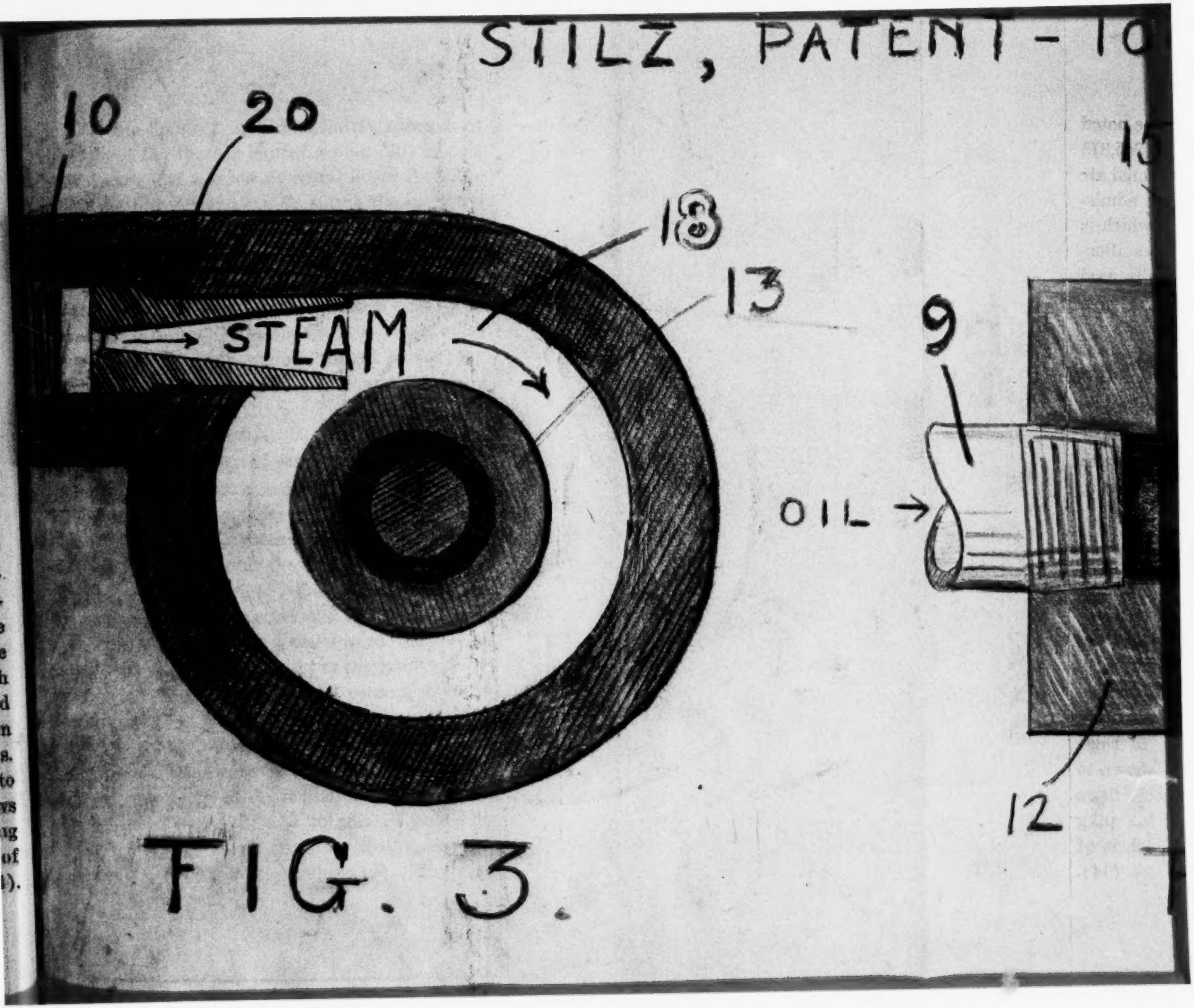


FIG. 3.

Z, PATENT - 1066161 - Exhibit - B.

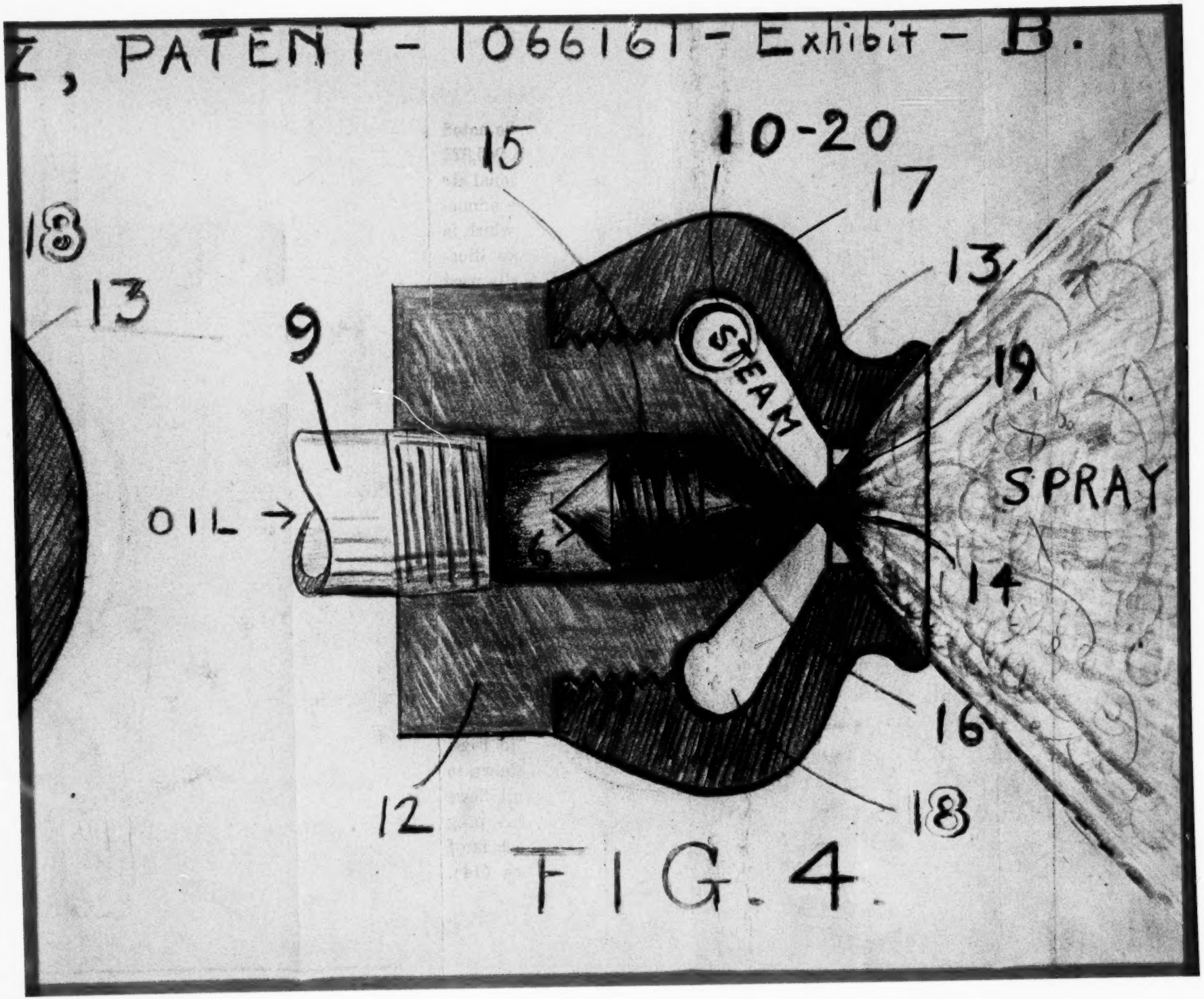


FIG. 4.

Within this chamber, and immediately adjacent to the orifice (14) there is located a plug (16) having conical ends and a screw or spiral about its outer circumference, around which spiral the oil flows on its way to the orifice (14), thereby being caused to whirl rapidly about the axis of the nozzle as it flows longitudinally through the same. Surrounding this plug (12) and *fastened to it* so as to *form a part of the complete atomizer* is a casing (17) so shaped as to leave a *shallow* conical passage between the inside of the casing (17) and the outer conical end of the plug (12).

Referring particularly to Fig. 3, annexed, steam or other atomizing agent flows through the pipe (10) into the circular chamber (18), which is the shallow conical passage above referred to. The axis of this pipe (10) is arranged tangentially to the passage (18) so that the steam flowing out of this pipe (10) at a high velocity rotates around in the passage (18), the velocity of this rotation increasing as the steam flows toward the orifice (19) of the casing (17), owing to the gradual constriction of the passage. The oil passing through the orifice (14) of the interior plug (12), as already stated, is rapidly rotated and immediately takes the form of a hollow conical *film* extending across from the outer edge of the nozzle (14) to the outer edge of the orifice (19) and substantially closing off the passage of steam from the shallow conical chamber (18) within the casing (17). The *vio-*

lently rotating jet of steam passing out of this casing as a consequence *penetrates this oil film, tearing it apart into minute particles,* or, in other words, *atomizing* it and discharging it into the furnace in the form of a cone of oil *spray* and steam substantially as indicated by the dotted lines in Fig. 4, annexed. The oil is consequently completely atomized on leaving the orifice 19, and the air for combustion, passing through the openings 5 in the register (4) as shown in Figure 1 of the patent, and thence through the opening (8) in the fire brick (the opening into the furnace), intermingles in the well-known manner with the conical *spray* of atomized oil, so that oil and air are in a proper state for the combustion to take place.

. The specification clearly indicates that the mechanical atomization of the oil is not considered sufficient and for the purpose of heating, as well as more completely *atomizing* the partially atomized oil, steam is desirably introduced. On page 1, lines 43–46, the specification states:

> In order to secure perfect combustion with this variety of oil a suitably directed jet of *steam* is a valuable adjunct for securing perfect *atomization.*

In line 66 the specification further states:

> In accordance with my invention the *steam* is brought into action upon the oil in such a manner that the mechanical action of the jet is not interfered with.

And, further, in lines 79–81, the specification states as an object of the invention—

> To reduce to a minimum the quantity of *steam* needed to assist in the *atomization* of the oil. (Italics ours.)

These quotations, together with the whole context of the specification, drawings, and claims indicate that the *essence* of the *invention* was the utilization of *steam* or other gaseous medium as an important feature, and as of the *essence of the invention* for the purpose of completely *atomizing* the oil.

In this case, as in the case of the former patent, under certain conditions the steam can be entirely shut off (see lines 103–109, p. 1), under which conditions of course, the atomizer acts purely as a mechanical atomizer such as is described as a prior art structure in lines 19–26 of page 1 of the specification, admittedly old and well known, and shown in many patents referred to, particularly on pages 21 and 22 hereof.

ANALYSIS OF CLAIMS

Referring to claim 1 of this patent 1066161 in suit, this claim consists of a combination of the following elements:

1. A *nozzle having a small discharge orifice* (the nozzle being (12) and the discharge orifice being (14) of Fig. 4).

2. *Means immediately adjacent to said orifice for producing a whirling motion in a liquid fluid pass-*

ing therethrough. (These means being the plug located within the nozzle (12) and having the conical ends (16) with the spiral threads (15) upon its outer circumference.)

3. A *casing surrounding said nozzle and having a restricted discharge* port concentric with said orifice. (This casing being the casing (17) having the restricted discharge port (19) forming an integral part of the atomizer.) The specification states in this connection, page 2, lines 101–112—

> The member (12) is screwed into or otherwise secured in a casing (17), which is provided with annular groove (18) extending around the base of the cone-shaped end of the member (12). The casing extends somewhat beyond the discharge end of the plug and is there provided with an outlet (19) somewhat larger than the outlet (14). The casing is hollowed out so as to produce a shallow annular passage extending around the cone-shaped end of the plug from the passage (18) to the discharge outlet (19).

4. *Means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current.* (These means being the tangentially located nozzle 20 inside the casing 17 in conjunction with the shallow annular conical-shaped chamber lying between the inside of the casing (17) and the conical end 13 of the nozzle or plug (12).)

Claim 6 consists of a combination of the following elements:

1. A *furnace having an admission hole through its casing.* (This element being the furnace marked (1) with its opening (8), Fig. 1 of the patent.

2. A *nozzle having means for projecting a hollow cone-shaped film of oil from a round unobstructed delivery orifice into said furnace through said hole.* (This element is the nozzle or plug (12) shown in Fig. 4 and includes the small internal plug with the conical end (16) and the screw threads (15) thereon.)

3. *Means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil.* (These means being the casing (17) in connection with the steam inlet pipe and the steam nozzle (20) as shown in Figs. 3 and 4, and all forming an integral part of the atomizer.)

4. *Means for supplying air into the furnace through said hole.* (This element is the register (4) with the air admission holes through the circumference shown in Fig. 1.)

Claim 7 is a combination of the following elements:

1. *A furnace having an admission hole through its casing.* (This element being the furnace (1), the hole referred to being hole (8).)

2. *A lining of refractory material for said hole.* (This lining being shown in Fig. 1 and marked (3).)

3. *A nozzle having means for projecting a hollow cone-shaped film of oil into said furnace through*

said hole. (This element is the nozzle or plug (12), including the interior plug with the conical end (16) and spiral or screw threads (15).)

4. *Means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil.* (This element is the casing (17), including the steam connection (10) and the steam nozzle (20) shown in Figs. 3 and 4, and forming an integral part of the atomizer.)

5. *Means of supplying air into the furnace through said hole.* (These air-supplying means being the register (4) with the air inlets about its circumference as shown in Fig. 1.)

In commenting on the claims of this patent it is to be noted that the applicant in claims 6 and 7 refers to the " means " surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to *penetrate* said " *film of oil,*" this expression constituting element 3 of claim 6 and element 4 of claim 7. This penetration, which is a vital function of the specific atomizing means constituting one of the *essential* elements of each of these claims, is caused by the *violent whirling* of the *atomizing agent*—either steam or air—*in the casing* (17), and the fact that it is *concentrated by means of this casing* so that it impinges directly upon the conical *film of oil* just as this film forms after leaving the small orifice of the oil nozzle and *before the film has traveled far enough to break up into oil spray, and causes it to break up into spray.*

These parts which cause the steam to perform this function of penetrating the film of oil are *a part of the atomizer* itself, and have no direct connection functionally or otherwise with the register or the means for supplying additional air for combustion; these means for supplying air for combustion being *additional* means to those supplying the atomizing medium, and comprising the air register (4) with its holes, these being a distinct, additional, and separate element of the combination as set forth in claims 6 and 7; being the element 4 of claim 6 and element 5 of claim 7.

It is further to be noted that air for combustion entering the register (4) need not have any great amount of energy, as *this air does no work whatever upon the oil,* but simply needs sufficient energy to mix thoroughly with the atomized oil in the form of *spray.*

SCOPE OF PATENTS SHOWN BY PHRASEOLOGY OF SPECIFICATIONS OF THE PATENTS THEMSELVES

It is, of course, a well settled principle of law that claims are to be explained, construed, and interpreted by the specifications and drawings, and that a patentee's broadest claim can be no broader than his actual invention as so disclosed.

No patented invention can be practically or fairly understood or explained if the language of the claims is entirely dissociated from the specification, and the claims and specification should be read together. (*Filer Stovell Co.* v. *Diamond Iron*

Works, 250 Fed. 454, C. C. A. 7th Cir., 1918); *Mitchell* v. *Tilghman*, 19 Wall. 287–391; *Westinghouse* v. *Boyden*, 170 U. S. 537, 558; *Bragg* v. *Fitch*, 121 U. S. 478–483; *Caster* v. *Spiegel*, 133 U. S. 360; *Howe* v. *National*, 134 U. S. 388.

A claim is not limited to the particular shape specified and illustrated *unless something depends upon such shape*, but conversely, a claim *must* be so limited when *something does depend upon it*—that is, when the form and mode described are as a matter of fact the limitations of inventive thought. (*Outlook Envelope Co.* v. *General Paper Co.*, 239 Fed. 877–880, C. C. A. 2d Circuit.)

The case of *White* v. *Dunbar*, with its well-known illustration of the nose of wax is pertinent and cited as illustrative of the rule applicable to the instant case.

> *White* v. *Dunbar*, 119 U. S. 47 at p. 51;
> *Keystone Bridge Co.* v. *Phoenix Iron Co.*, 95 U. S. 274, 278;
> *Jones* v. *Campbell*, 104 U. S. 356, 370.

In the patent specification of No. 945,873 we find on page 1, lines 26 to 39 inclusive, that the patentee himself commences by admitting that at that time (date of his application)

> * * * successful burners employ means for breaking the oil into a fine mist or spray, which can readily be acted upon by the heat within the furnace, as well as be intimately mixed with the supply or air for supporting combustion. Nozzles of the centrifugal type

> which deliver a jet having a high rate of rotation as well as a rectilinear velocity, cause the issuing fluid to be atomized to such an extent that, when operating in conjunction with an ample supply of air into a furnace with established high temperature, complete combustion is effected.

In the specification of patent No. 1,066,161, page 1, lines 19 to 30, the complainant also says, speaking of apparatus *then known and used:*

> In the burning of fuel oil, atomized in passing through nozzles which spray it into a fine film by mechanical means (effected usually by the centrifugal action of a rapidly rotating jet from a small circular orifice, causing the oil to leave the orifice as an evenly spread mass over the surface of a cone), it has been found necessary, for obtaining the best results, to preheat the oil to such an extent that a portion of it will flash into vapor on encountering the lower atmospheric pressure.

and he considered that the novelty of the invention shown in his two patents lay in the additional particular structure and mode of operation which utilized steam in the manner and by the devices shown.

The burners referred to in the preceding quotations from both patents are shown in the various " mechanical atomizer " patents referred to in this brief.

82357—25——4

Referring again to the two patents of appellant, we find him pointing out what he relied upon as constituting the *novelty* of *his* invention, and in No. 945873 he states on page 1, line 42:

> At *this stage* (that is, when starting combustion at which time "auxiliary means are useful") the oil should preferably be diluted with *air, steam,* or other gaseous fluid, which affords an *additional agency* for not only *inducing a strong current of air supply* (for combustion), but also for distributing the *atomized* oil through a large volume. (Italics and parentheses ours.)

He then proceeds to describe the particular features of construction of his structure, which are necessary in the application of steam or other gaseous fluid for the purposes of carrying out his supposed invention, and which he claims *distinguish it from the structures of the prior art* which he has been referring to. Especially on page 1, line 69, he describes his atomizer in the following language:

> The NOZZLE, *composed of an outer casing 1,* into which is fitted a center 2, is constructed so as to form an annular space which gradually decreases in diameter to that of the orifice 3 through which the discharge is made. Oil and steam are forced through ports 4 and 5, respectively, into this annulus near its largest diameter in a line approximately tangential to the same and in directions as indicated in order to produce a rotation of the fluids *therein* (that is, the

> NOZZLE) in a given direction. The areas of the ports 4 and 5 and the orifice 3 are kept small in order that the *velocities* of rotation and projection may be great, so that the energy producing the same may be effectively utilized for *disintegrating* the oil. (Italics and parenthesis ours.)

Again, on page 2, line 5, he says:

> The *two* fluids mix *within the annular space of the* NOZZLE and on issuing from the orifice 3 at a high velocity they induce a strong current of air (through the register). When the current of air is supplied to the furnace by either forced or natural draft, the supply of steam may be cut off after the combustion has been properly established, the mechanical atomization of the oil alone proving sufficient under these conditions. (Italics and parenthesis ours.)

In patent No. 1066161 he also points out that the features of *his* invention lie in the peculiar structure and parts for the *atomization* by steam or other gaseous medium. For instance, he says on page 1, line 43:

> In order to secure perfect combustion with this variety of oil, a *suitably directed jet of steam* is a valuable adjunct for *securing perfect* ATOMIZATION; the *steam* which is introduced acting upon the oil in a manner similar to and producing results similar to those produced by the vapor which flashes into existence with such oils as can be partially vaporized.

And again, on the same page, line 63:

> In *accordance with my invention* the *steam* is brought *into action upon the oil,* etc.

And in line 74:

> Consequently my invention may be regarded as having for further objects the production of a burner which will efficiently burn any of the different kinds of fuel oil in commercial use and to reduce to a minimum the quantity of *steam* needed to assist in the ATOMIZATION of the oil.

And again, in lines 93 to 96:

> * * * to utilize the velocity of the *atomizing steam* in such a manner that it will be dissipated in diffusing the oil into a *spray,* etc. (Italics ours.)

He then proceeds to describe the peculiar structure of his atomizer, which includes the already-described casing, which, through its position and relation to the interior oil nozzle forms a *shallow* annular *confined* space in the NOZZLE into which the *steam* enters with a *violent* rotary motion to assist in *atomizing the oil;* showing throughout that his whole device is distinguished from the devices of the prior art known as " mechanical atomizers " through the very fact that he does utilize *steam* as an essential feature of his invention, and the portions which permit the *utilization of the steam are essential parts of his actual integral and unitary atomizing NOZZLE structure.* This is

particularly shown on page 2, line 101, where he describes the casing 17, inside of which the steam is confined and circulated, as being screwed or otherwise secured to the member 12, which is his oil nozzle forming also a part of the whole, so as to *form with it the mixing chamber.*

He further describes the *operation* of his device, particularly beginning in line 130 at the bottom of page 2 and continuing at the top of page 3, as follows:

> The operation is as follows: The oil leaves the *inner* orifice of the nozzle in a conical spray, and *before it can pass through the outer orifice* (of the nozzle) it is caught by the rotating *steam* and is perfectly *atomized.* (Parenthesis and italics ours.)

Finally, he says on page 3 of his patent No. 1066161, commencing with line 9:

> It will be seen that the quantity of *steam* required for *atomizing* purposes is of course greatest when the fire is being started. With a strong draft and high furnace temperature once established, the supply of steam can be greatly reduced and in some conditions completely discontinued without detracting from the efficiency of combustion. In this case the mechanical atomization of the oil suffices. (Italics ours.)

This clearly indicates that appellant undoubtedly contemplated and relied upon his peculiar structure constituting a *steam atomizer* to accomplish *atomization* primarily, for without this feature the

mechanical atomization which he states is possible after shutting off the steam, is merely a reversion to the old mechanical atomization, which, it has been and will hereafter be more at length pointed out, was very old and well known in the art.

From all of these quotations from his patent it is clear that *he* himself considered his invention to be not a mere "mechanical atomizer" but a "*steam atomizer,*" or one using compressed air or other gaseous medium in the same manner that steam could be used, and *distinguishing* the use of that steam or other gaseous medium and the *structure* adapted to so use it from the plain *mechanical atomizers of the prior art* in which air was only used for *combustion* and not for *atomization.*

SCOPE SHOWN BY APPLICANT'S OWN STATEMENTS IN PROCEEDINGS IN THE PATENT OFFICE, FILE WRAPPER AND CONTENTS EXHIBIT B-1

In the case of *Greene* v. *Buckley,* 135 Fed. 520 at 531, Judge Townsend, speaking for the Circuit Court of Appeals in the Second Circuit, expresses the rule that a patent must be construed in the light of amendments and arguments made while the application was pending and says:

> Where the patentee specifies a particular form as a means by which the effect of the invention is produced, or otherwise confines himself to a particular form of what he describes, he is limited thereby in his claim for infringement. (Walker on Patents, 4th Ed., Sec. 363 and cases cited.) * * *

> The words of limitation inserted in a claim must be construed in the light of the circumstances surrounding the issuance of the patent in order to prevent an undue broadening of the scope of the invention. (*Singer Mfg. Co.* v. *Cramer,* 192 U. S. 265, 285.) In interpreting such a patent the *admissions* and *declarations* of the patentee in the Patent Office, and amendments made by him which relate to the essence of alleged improvements and are directed to the question of invalidity, when understandingly and deliberately assented to, are binding upon him. (*Reece Buttonhole Machine Co.* v. *Globe Buttonhole Machine Co.*, 61 Fed. 958, 10 C. C. A. 194.) (Citing also other cases.) (Italics ours.)

and in *Dowagias* v. *Superior* (115 Fed. 886–896), in the Circuit Court of Appeals for the Sixth Circuit, the court said:

> Whatever doubt there might have been as to whether the claim was limited to the construction of its language by the specification, it was removed by the limitation which he put upon it by his *explanation,* the consequence of which was the allowance of his patent; and the claim must be read as *limited in this respect.* (Italics ours.)

As was clearly set forth by Mr. Justice Strong in *Goodyear Dental Vulcanite Co.* v. *Davis* (102 U. S. 222, 227):

> This construction of the patent is confirmed by the avowed understanding of the patentee, expressed by him, or on his (be)-

> half, when his application for the original patent was pending. We do not mean to be understood as asserting that any correspondence between the applicant for a patent and the Commissioner of Patents can be allowed to enlarge, diminish, or vary the language of a patent afterwards issued. Undoubtedly a patent, like any other written instrument, is to be interpreted by its own terms. But when a patent bears on its face a particular construction, inasmuch as the specification and claim are in the words of the patentee, it is reasonable to hold that *such a construction may be confirmed by what the patentee said when he was making his application.* The understanding of a party to a contract has always been regarded as of some importance in its interpretation. (Italics ours.)

Following this rule appellee's contention is further supported by the proceedings in the Patent Office in which the appellant by the argument of his attorney (which, of course, is constructively his own argument as it was accepted by him) finally secured an issuance of the patent. He says in Paper No. 6, page 3, of the file wrapper and contents (Exhibit B–1, Finding III):

> Applicant has found that the oil can be atomized most successfully only by introducing it into the *atomizing agent* in the form of a thin film or layer. This can only be accomplished by spreading the oil into a thin conical layer by a proper whirling action or other means. It is further necessary that the oil enter the *atomizing agent* BEFORE

> THE LATTER LEAVES *the* NOZZLE, since otherwise the results will be unsatisfactory. (Italics ours.)

And again on the same page:

> In applicant's arrangement the conical layer of oil is forced directly into the rotating current of gas *because the latter is confined in a narrow space surrounding and immediately adjacent to the restricted discharge orifice.* In this way there is a complete intermingling of the two elements and perfect atomization of the oil. (Italics ours.)

Thus the integral casing 17, forming this " narrow space," within which the " oil enters the atomizing agent *before the latter leaves the nozzle,"* is by the applicant himself shown to be an essential part of the atomizing NOZZLE itself, and is a vital element of his alleged invention. It was only because of this feature which he maintained *distinguished it from the prior art* of mechanical atomizers, that the patents were finally allowed; though even this feature was old as we shall show from other patents that were not before the Patent Office.

SCOPE SHOWN BY APPLICANT'S DISTINGUISHING FROM PRIOR ART

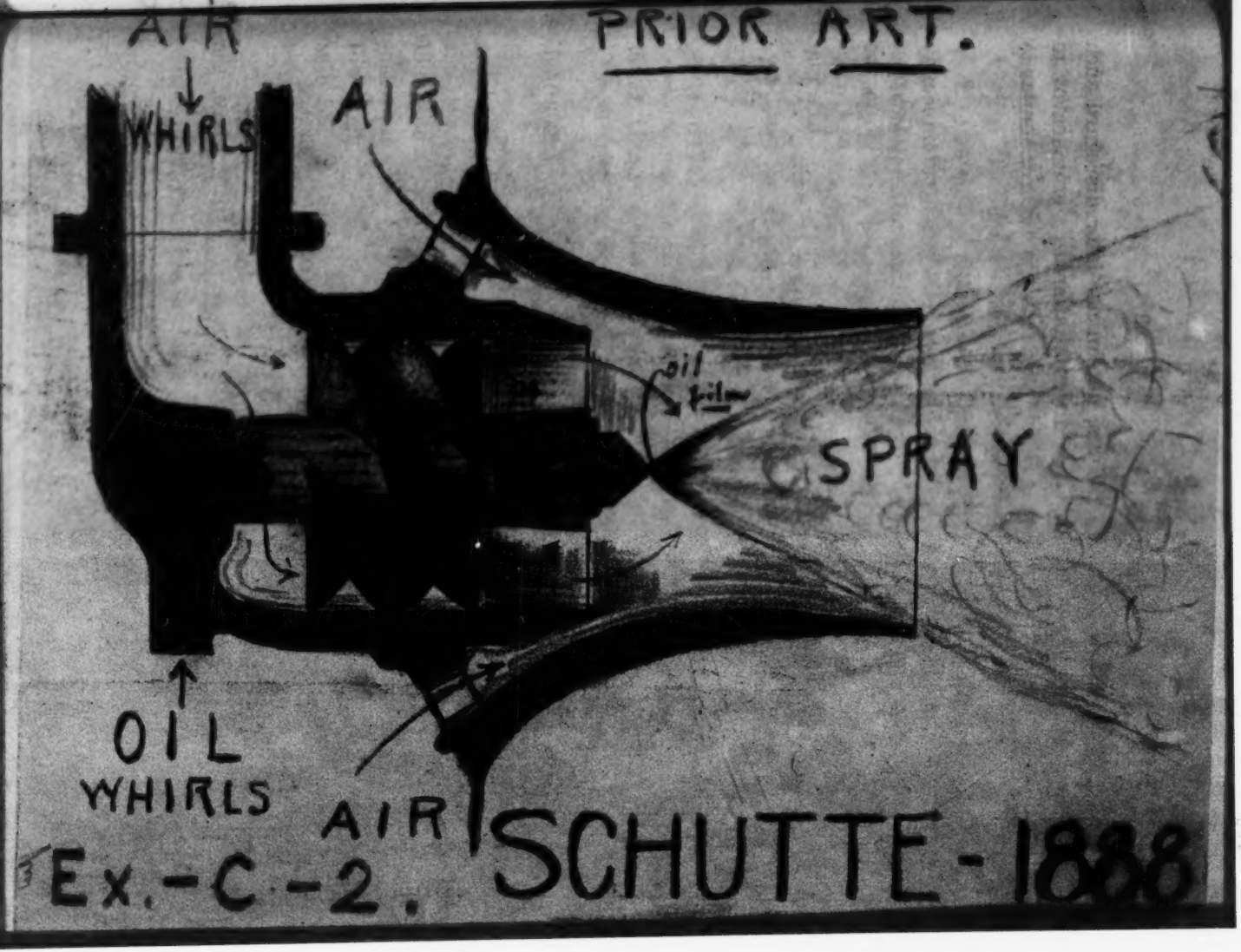
Where an applicant for a patent in his arguments or actions in the Patent Office, as shown by his file wrapper and contents, *distinguishes* his structure from *references to the prior art,* thus contending that his invention is *different* from

those references, he can not later disregard such argument and differentiation in the endeavor to maintain that his claims cover structures similar to the distinguished references.

> Having thus narrowed his claim * * * in order to obtain a patent, the patentee may not by construction or by resort to the doctrine of equivalents give to the claim the larger scope which it might have had without the amendments which amount to a disclaimer * * *.
>
> *Weber Elec. Co.* v. *Freeman Elec. Co.*, 256 U. S. 668 at 677.
>
> Citing *Shepard* v. *Carrigan*, 116 U. S. 593 at 598.
>
> *Hubbell* v. *United States*, 179 U. S. 77 at 80.
>
> *Grever* v. *U. S. Hoffman Co. et al.*
>
> *U. S. Hoffman Co.* v. *Lasance*, 202 Fed. 923.

If he was acting in good faith, he desired the Patent Office to understand that *his device was different from the reference.* There is no doubt that the Patent Office so understood his representations. Under these circumstances applicant will not be heard to assert *that the court should give the claims allowed a meaning which will cover a device similar to the reference.*

> *Ajax* v. *Pettibone*, 125 Fed. 748, see page 753. (C. C. A.)
>
> *Roemer* v. *Peddie*, 132 U. S. 313.
>
> *Phoenix* v. *Spiegel*, 133 U. S. 360.


PRIOR ART.
AIR
WHIRLS
AIR
oil
SPRAY
OIL
WHIRLS
AIR
Ex.-C-2.
SCHUTTE-1888

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Now, further on in this paper last cited (No. 6, p. 3, Exhibit B–1) he goes further and *distinguishes* his structure from that shown in the patent to Schutte (Exhibit C–2) (See illustration opposite p. 52), which is a patent for a " mechanical atomizer " not utilizing steam or air or other gaseous medium for atomization, but only for combustion. The necessary inference, of course, is that by so distinguishing from Schutte's mechanical atomizer and claiming that his device is different therefrom, his invention is consequently for a different type of atomizer—that is to say, one employing his peculiar structure and means utilizing *steam* or other gaseous medium for atomization—in other words, for a " steam or air atomizer."

In Paper No. 8, page 6, he again distinguishes his structure from that of Schutte in order to get around the Examiner's objection. Further along on the next page (7), he continues the argument that his device operates on a different theory and principle from that of Schutte, where he says:

> Applicant's burner depends upon small orifices, and this is just what Schutte tries to avoid.

(Right here it may be interjected that appellee's structures are substantially the same and operate on the same principle as the patent to Schutte which the appellant has so assiduously sought to distinguish from his invention.)

Continuing to quote from Exhibit B–1, the applicant states in Paper No. 10, page 2:

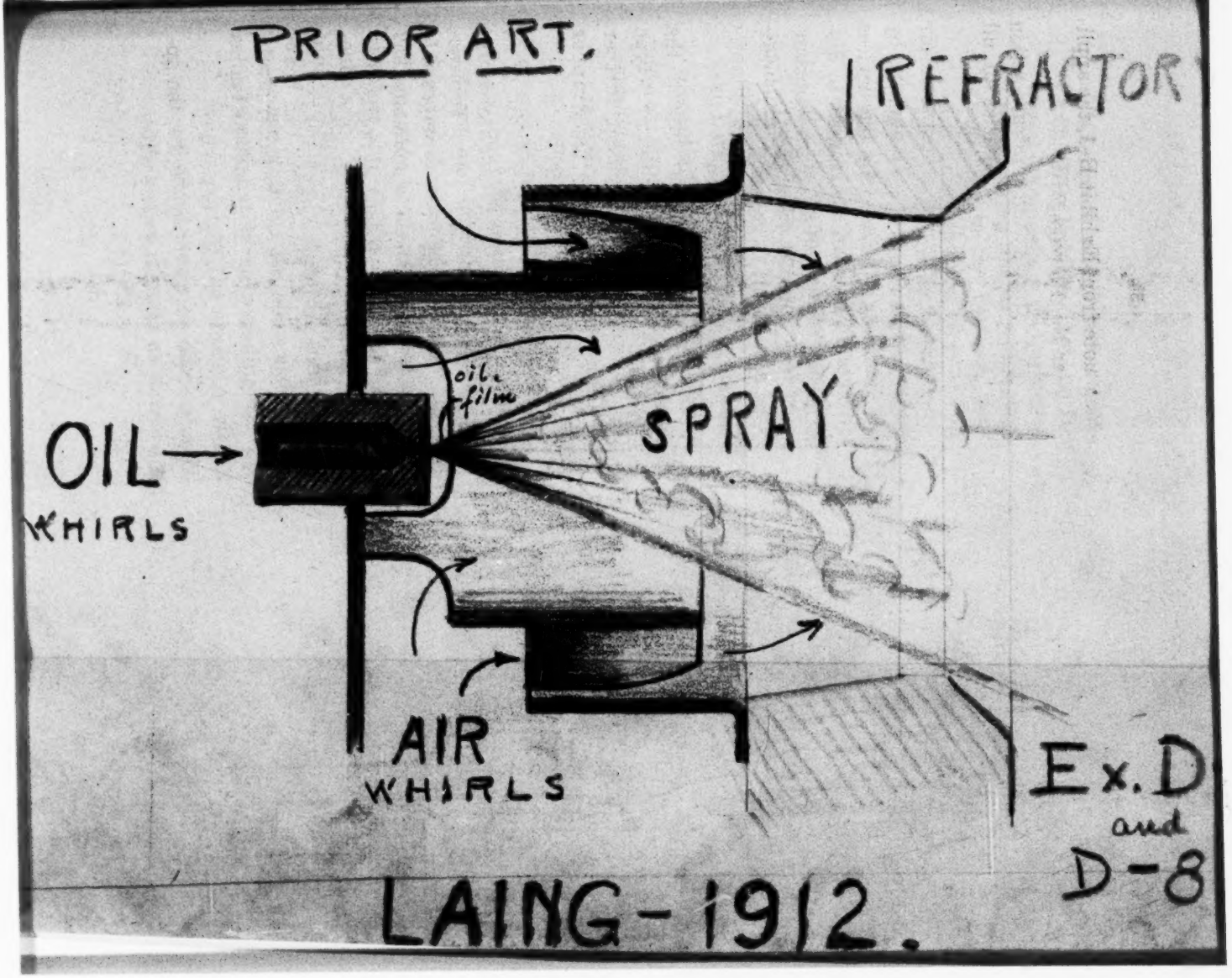
> To produce atomization *violent* action which will tear the small particles of oil apart is necessary.

This violent action peculiar to " steam or air atomizers " is accomplished, as he points out, by *his* device, but is *not* accomplished by the devices (" mechanical atomizers ") which he seeks to distinguish from his device, and which are substantially identical with the appellee's, and which latter, therefore, must be different from appellant's structures.

Our contention that appellant recognized the fact that his is the " steam or air atomizer " type is further strengthened by his statement further on on page 4 of Paper No. 23 of the file wrapper and contents:

> The extreme rigid characterstics of a stream escaping from under a high pressure through an orifice are well known. To *penetrate* such a *stream with a gas is impossible by any ordinary means.* Applicant has found that only by concentrating a *violently* whirling stream of gas at the *apex* of a cone-shaped *film of liquid,* and thus bringing into play powerful centrifugal forces, can heavier liquid fluid be thrown to the outer strata of the stream of gaseous fluid. (Italics ours.)

And finally, in Paper No. 23, on page 4, the applicant states:


PRIOR ART.
REFRACTOR
oil film
SPRAY
OIL
WHIRLS
AIR
WHIRLS
Ex. D
and
D-8
LAING-1912.

> **Claims 6 and 7 are rejected on Laing 1,025,279 (Exhibits D–6 and D–8) (see illustration opposite p. 54), which shows a means for whirling the air which enters the admission hole to the furnace, but the whirling air is *not directed to penetrate the oil film.* In applicant's device the whirling current of air, or other atomizing agency, *penetrates* the mechanically atomized film of oil, getting on the inside of it, and in *addition* there is shown a means for supplying the air into the furnace through said hole from a separate source.** (Italics and parenthesis ours.)

The Laing patent so distinguished, like Schutte's is subsantially identical with appellee's structures, and, as appellant himself maintains, is *different from his invention.*

It is clear, therefore, that appellant's contention for a broad construction of his claims to cover burners in which the oil is atomized mechanically and without the assistance of steam or other gaseous medium, and in which air is admitted to mix with the already atomized oil only for the purpose of combustion, is not tenable, but that the proper construction is, that it should be limited to a structure utilizing steam or other *atomizing agent* and more particularly to a structure which *in itself* comprises a nozzle whirling the oil, a casing practically integral immediately surrounding the oil nozzle and *forming a part of the atomizer* NOZZLE *proper,* inside of which steam or other atomizing agent is whirled in such a manner as to assist in the atomi-

zation of the oil *before it issues* from the atomizing NOZZLE structure itself into any additional device for supplying air for combustion, such as the register surrounding the aperture into the furnace. All of which is shown in his drawings and particularly described and declared to be his invention.

In his claims 6 and 7 of patent No. 1,066,161, the patentee specifies as his 4th and 5th elements, respectively—

> *and* means for supplying air into the furnace through said hole. (Italics ours.)

These are *additional* to the specified means for supplying air or other gaseous medium for atomizing the oil and are his register 4 with air openings. THUS BY HIS VERY INCLUSION OF THESE WELL-KNOWN MEANS IN HIS CLAIMS AS AN *ADDITIONAL* ELEMENT HE ADMITS THAT SUCH A REGISTER IS NOT AN EQUIVALENT OF THE STEAM OR AIR CASING USED FOR ATOMIZATION TO WHICH HE MAKES IT *ADDITIONAL* IN HIS CLAIMS.

SCOPE SHOWN BY DECISION OF BOARD OF EXAMINERS IN CHIEF (EXHIBIT B-1)

That the *Board of Examiners in Chief* clearly understood that the application for patent No. 1066161 contemplated and was *limited* to the peculiar integral device, with structural parts ar-

ranged as illustrated in the drawings and description and adapted to perform the function of atomizing the oil by the admission of a violently whirling current of steam *into the body of the atomizer nozzle itself* near the point of issuing of the oil jet into the confining mixing chamber, and was not for a device covering broadly a mechanical atomizer with means for admitting air outside of the atomizer for combustion only, is apparent from the language of their decision in which the reason for such decision is that—

> * * * there being in the prior art, as it is revealed by the Examiner, no construction in which a whirling *liquid cone of fuel* is projected through a surrounding and whirling gaseous mass. (Italics ours.)

Now, the *Board* had before them many of the instances of the prior art showing "mechanical atomizers" using air for combustion in which both the oil and air were whirled, but in which they thought evidently and correctly that the air or steam did not enter in a violently moving current so as to break up or penetrate the *liquid cone of fuel* so as to *atomize* it as is done in the peculiar form of Stilz atomizer because of the shape, proportion, and location of the casing 17 forming a part of the atomizer and immediately surrounding the tip of the oil jet. Therefore it is inconceivable that if they had felt that the claims were capable of the *broad* construction now sought to be given them by appellant, they would have allowed them in view of

the various instances of the prior art cited herein and which were before them, but which were " mechanical atomizers " and not " steam atomizers " or those using other gaseous mediums for atomization; and it is to be noted here in anticipation of a point to be treated further on, that the patents to Kermode (Exhibit C–11), Armstrong (Exhibit C–12), and Anthony (Exhibit D–9) were not before the *Board* and so were not considered by them in their decision, which it is believed would have been entirely different had they been so before them and considered, and in that case the claims would have been rejected by the Board for lack of novelty and invention.

Furthermore, the Board of Examiners evidently had in mind that the Stilz claims were *limited* to his *specific means* shown in the drawings, including the integral casing 17 and steam chamber 18, which projected, as the decision says, a *liquid cone of fuel* " through the surrounding and whirling gaseous mass "—for the patent to Schutte (Exhibit C–2) distinctly specifies that the fine *spray* or *mist* as an " expanding jet is projected centrally into a surrounding column of air (whirling) and mingles therewith (Exhibit C–2, p. 1, line 36). If this distinction and limitation of the Stilz patent is ignored, then Schutte must uncontrovertibly disclose the same idea of means, and the Board must have been in error in allowing the patent over the Schutte patent. It consequently seems clear from these quoted

passages from the contents of the file wrapper that the Stilz invention as set forth in the proceedings in the Patent Office was the production of a conical oil film and then directing a violently rotating stream of steam or air directly upon the *apex* of this conical *film*, thereby breaking it up into fine particles—that is, atomizing it. It is clear that the first essential is the production of this conical film of oil either by the rapid rotation of the oil or by other means, such as, for instance, were shown in figure 5 of the original drawing, exhibit B–1, and the *second essential was the production of a rapidly and violently rotating gaseous fluid, and so directing it and confining it that it would be compelled to penetrate the already formed conical oil film before this gaseous fluid could escape from the restricted discharge orifice of the containing nozzle casing.* Without both of these essential characteristics being present and coacting, as already set forth, there could be no possible novelty in the Stilz disclosure. Thus when the atomizing agent or rapidly whirling fluid is cut off, as stated in the patent, that it may be, under certain circumstances, the structure functions and operates exactly as many of the prior structures already discussed and in no way is different from them or an advance over them.

The quotations from the file wrapper which have been given show, first, clearly: That the atomization is performed *within the nozzle structure it-*

self and is entirely independent of the air supply, which is introduced through a separate structure, namely, the register, and that that air supply is simply for the purpose of supporting the combustion. Furthermore, these quotations clearly show that it is *essential that the oil be in the form of a thin conical layer, and that the atomizing agent act upon it before it leaves the nozzle.*

It is furthermore essential that the atomizing agent or the rotating current of gaseous fluid be *confined in the narrow space immediately adjacent* to the restricted discharge orifice, so that there may be perfect atomization of the oil.

It is furthermore essential that the orifices be small in order that the oil and the atomizing agent be brought together intimately, and by "small," according to the quotations which we have referred to, orifices or discharge openings such as are used in the Schutte U. S. patent No. 391865 (Exhibit C–2) are not meant, but small in comparison to these orifices, these particular ones being referred to as being "large." In one of the quotations it states that "applicant's burner depends upon small orifices, and this is just what Schutte tries to avoid." The small orifices are essential so as to *confine* the energy of the *atomizing agent* or the rapidly rotating gaseous fluid, since, as applicant states, "to produce atomization *violent* action which will tear the small particles of oil apart is necessary." This violent action is necessary, due,

as applicant states, to " the extremely rigid characteristics of a stream escaping from under high pressure through an orifice * * *." (Italics ours.)

In view of the above there can be no question as to what applicant had in mind, and from the quotation from the decision of the Board of Examiners already given, it is clear that they regarded that the invention lay in the formation of a whirling *liquid cone of fuel* and the projection of this cone of liquid fuel through a surrounding and whirling gaseous mass, which, in other words, means the same as directing the whirling gaseous mass upon this cone of *fluid* so as to atomize it. While in view of the prior art, some of which was not before the Examiners in Chief, we do not agree with their decision that it was novel to do this, the decision nevertheless clearly indicates the idea which the Examiners in Chief held as to the mode of operation of the Stilz device and for which the patent was granted. In this respect their opinion is in entire agreement with our contention on this point. Thus from the statements in the patents themselves; from appellant's own statements in the communications to the Patent Office while prosecuting his applications, especially in distinguishing from the prior art; and from the decision of the Board of Examiners in Chief of the Patent Office:—we must conclude that, referring to patent No. 945873: The *two* inlets referred to in claim 2 are inlets to

the *atomizer itself*. Neither one of them can by any stretch of the imagination be considered to be the air inlets into the register or the opening from the register into the boiler, inasmuch as these inlets are shown in the Stilz patent in *addition* to the independent inlet for a gaseous fluid and a liquid referred to in the claim. Of course, the mode of operation of the Stilz device is entirely different from mechanical atomizers, such as are the appellee's, inasmuch as the Stilz device depends upon the energy of an *atomizing agent* to cause the atomization, whereas mechanical atomizers, such as are appellee's, depend strictly upon the energy contained within the oil itself to cause its atomization. And with reference to claim 1 of the Stilz patent No. 1,066,161, the structure as set forth in that claim is *limited* to an atomizer having means for causing a gaseous fluid passing through the space *within the casing of the atomizer nozzle* to enter the discharge port of the atomizer nozzle in a whirling turn. The structure here set forth is the atomizing nozzle itself and the claim does not refer in any way to the register or the means for admitting air for combustion purposes. The gaseous fluid referred to in the claim is the *atomizing agent* used to *atomize* the oil. In mechanical atomizers such as appellee's structure there is no means for causing a gaseous fluid to pass through any space within the casing of the atomizer nozzle or to enter any port thereof in a whirling current. Appellee's

structure makes *no use of any atomizing agent whatsoever, but depends solely upon the energy contained within the oil itself to produce its atomization.*

As regards claim 6 of this last-mentioned patent, it is likewise *limited* to integral means surrounding the nozzle for producing a whirling stream of gaseous fluid therein, and is additionally limited to a structure *whereiu* this whirling stream of gaseous fluid is directed so as to penetrate the conical *film of oil* leaving the oil nozzle. The structure described in claim 6 is purely and simply a steam or other gas atomizer of specific form. Furthermore, in claim 6 it is impossible to interpret the means surrounding the nozzle for producing a whirling stream of gaseous fluid to penetrate the oil film as being the outside air register, because this claim further contains the element "*and* means for supplying air into the furnace through said hole." Which means is the register 4 of the Stilz patent and appears consequently in this claim as an element separate and distinct from, and additional to, the means to produce a whirling stream of gaseous fluid for atomization of the oil.

The same limitation applies to claim 7, the only substantial difference between these claims being that claim 7 is further limited to a structure having a "lining of refractory material for said hole."

Scope shown by appellant's real gift to public

We therefore may now sum up the argument as to the scope of appellant's patents by asking and discussing the question, " What did he give to the public, as a consideration for his patent grant, that the public did not have before? "

The measure of what he so gave is the measure of his monopoly during the life of his patents; and a corollary is equally true that anything utilized by the public which is or was presumptively in its possession can not be monopolized under a patent, nor held to be an infringment of a patent for a combination of old elements, even if that combination includes a new and patentable feature, unless the public also utilizes that new feature.

Taking up claim 7 of patent 1,066,161, first, we find that the appellant took from the prior art, which lay open to his hand, the first element of the claim (see analysis on p. 39 hereof):

> " A furnace having an admission hole through its casing." (This is shown as 1 and 8 in the patent drawings.)

This was well known; there was no novelty in it itself, or in combination with well-known oil burners, and it is specifically shown in the patents to Billow (Exhibit C–7), Armstrong (Exhibit C–12), Meyer (Exhibit C–13), Bevis (Exhibit D–5), Laing (Exhibit D–6), Corneuve (Exhibit D–1), and in the structure utilized in the Government's so-called

" Norfolk test," shown in Exhibits C–15 and C–17; in the publications " Engineering " (Exhibit C–16) and " Liquid Fuel, U. S. Naval Report " (Exhibit C–10, p. 331).

He then appropriated the equally well-known and old second element set out in the analysis on page 39:

> " a lining of refractory material for said hole." (Shown as 3 in the patent drawings.)

This is clearly shown in all of the last-mentioned exhibits.

Again, he abstracted from the prior art the old, old type of oil nozzle used as far back as 1888 by Schutte for the third element of his claim, and called it (again see p. 39):

> " a nozzle having means for projecting a hollow cone-shaped film of oil into said furnace through said hole." (Shown as 12, 14, 15, 16 in the patent drawings.)

Such a nozzle accomplishing the functions specified by expelling the oil through tangential openings is shown in the patents to Rusden and Eeles (Exhibit C–4), Laing (Exhibits D–6 and D–8), while the *identical* type of nozzle shown by him in which the oil is whirled through the blades of a spiral was undoubtedly copied by him from some one of the structures shown in patents to Schutte (Exhibit C–2), Armstrong (Exhibit C–12), Meyer (Exhibit C–13); in the structure of the "Norfolk test " (Exhibits C–15 and C–17); in the publications Engineering (Exhibit C–16), and

"Liquid fuel, U. S. Naval Report" (Exhibit C–10), all of which were presumptively or actually known to him.

But once more he puts his hand into the collection of available devices well known in the art of oil atomizing and burning and draws out the fifth element of the claim, as set forth on p. 40 hereof—

> "*and* means for supplying air into the furnace through said hole." (Italics ours.)
>
> (Shown as the box or register 4 having the openings 5 illustrated in his patent drawings.)

The air so supplied is for *combustion* only and is ADDITIONAL to any air that may be supplied for *atomization*. This box or register performs identically the same function—that is to say, supplying air for combustion after the atomization is complete—as is shown in the patents to Billow (Exhibit C–7), as far back as 1899 (Normand, Exhibits D–4 and D–7; Laing, Exhibits D–6 and D–8; Kermode, Exhibit C–11, fig. 7; Meyer, Exhibit C–13; Bevis, Exhibit D–5; Corneuve, Exhibit D–1); in the structure of the "Norfolk test" (Exhibits C–15 and C–17); and in the publications already mentioned (Exhibits C–16 and C–10).

So far appellant is only a borrower or appropriator of other men's ideas. He has taken everything from and given nothing to the public that it did not have before, since all the elements of his claims so far discussed are shown to have been well

known long before his alleged invention or application for patent, AND IN THE IDENTICAL COMBINATION AND ARRANGEMENT PERFORMING THE SAME FUNCTION BY THE SAME MODE OF OPERATION AND ATTAINING THE SAME RESULTS.

We come now to the fourth element of this claim, which at first sight appears to have some novelty; but this novelty, if it be such, will be shown to be apparent only and to lie solely in the matter of design or specific form adopted and not in the broad idea of means for accomplishing the end sought. But even were it novel and did it show the inventive faculty in merely adding it to other old and well-known devices, the very fact that it is the *ONLY* part that has even the shadow of a shade of novelty and invention among all the other elements shown to have been known in the prior art indicates clearly that the claim must be LIMITED TO A CONSTRUCTION EMBODYING THAT SPECIFIC FEATURE AND PARTICULAR FORM, since all else was admittedly old, and, furthermore, conclusively shown to be such by the prior art set out in Findings V and VI.

This fourth element is, as set out on page 40 hereof—

> "means surrounding said nozzle for producing the whirling stream of gaseous fluid directed so as to *penetrate* said *film of oil.*"

(Shown in the drawings as the casing 17, steam connection 10, and steam nozzle 20, figs. 3 and 4. Italics ours.)

This element or means comprises a particularly shaped and constructed atomizer casing or mixing chamber disposed and arranged in a particular relation to the well-known type of oil nozzle and forming a *unitary* or *integral* part of it, and the functions of which as he says in his patent and the arguments before the Patent Office which resulted in its grant, constitute the particular excellence of his device and *DISTINGUISH IT FROM THE PRIOR ART;* and this *SPECIFIC ATOMIZER CASING,* according to him, is new (although this is emphatically denied by Appellee), as will be hereafter shown more at length under the heading " Invalidity," page 98.

Referring again to this fourth element, the court's attention is again respectfully and urgently invited to the fact that the " means " referred to in this element are the *casing* 17, which forms a *structural* and what may be said to be an *integral* part of the *unitary* device called an atomizer, formed, as he himself describes on p. 2, lines 101 et seq. of his patent No. 1,066,161 by screwing or otherwise securing the casing 17 to the oil nozzle. Without this casing and associated parts *so* secured and arranged his device fails to perform the functions he claims for it, and if it were eliminated from his combination would leave

him nothing more than the well-known mechanical atomizer shown in so many instances or referred to in the prior art. He describes it and its special functions fully and in detail, beginning on page 2 of his patent at line 101, and continuing to and including line 8, page 3.

From this it will be observed that the feature claimed to be novel is really only the casing 17 "screwed" or otherwise "secured" to the oil nozzle 12.

At the risk of apparent and unnecessary repetition, attention is again invited to the specification of the patent No. 1,066,161 in the following quotations which are given at length in order to emphasize the contention that Appellant is LIMITED to the combination including this PARTICULAR feature in its SPECIFIC FORM and embodiment, and it is not to be confused with the portions of Appellee's structure which Appellant states are equivalents of it. In line 102 et seq., page 2 of the patent, Appellant says that the—

> casing 17 is provided with an annular groove 18 extending around the base of the cone-shaped end of the member 12—

and, further, the construction of the casing 17 is specified as being—

> *hollowed* out so as to produce a *shallow annular* passage extending around the cone-shaped end of the plug 12 from the passage 18 to the discharge outlet 19. (Italics ours.)

The steam in this casing 17 is described in lines 122 et seq., as flowing along the passage 18 and traveling toward the discharge outlet in—

> a *thin* whirling *layer*—

and as being in a condition of—

> *violent* rotation * * * around the axis of the nozzle—

and that the structure which includes this fourth element must necessarily be a " steam atomizer " is evident from the next passage found on page 2, line 130, and continuing on the next page:

> The oil leaves the inner orifice of the nozzle in a conical spray, and *BEFORE IT CAN PASS through the outer orifice* (that is to say, of the *ATOMIZER* nozzle) it is caught by the rotating steam and is perfectly *ATOMIZED*. (Parenthesis and italics ours.)

And further bearing out this contention, reference is again made to the file wrapper and contents of the Stilz patent (Exhibit B–1), where his argument is most significant as showing *HIS OWN CONCEPTION* of what constituted his supposedly novel gift to the public, it is found in paper No. 6, page 3, and reads as follows:

> In applicant's arrangement the conical *LAYER OF OIL* is forced into the rotating current of gas (that is to say, steam, air, or other gaseous medium) because the latter is *CONFINED* in a *NARROW* space

> *SURROUNDING* and *IMMEDIATELY ADJACENT* to the restricted discharge orifice, etc. (Parenthesis and italics ours.)

In paper No. 23, page 4, of the file wrapper and contents (Exhibit B–1) he says:

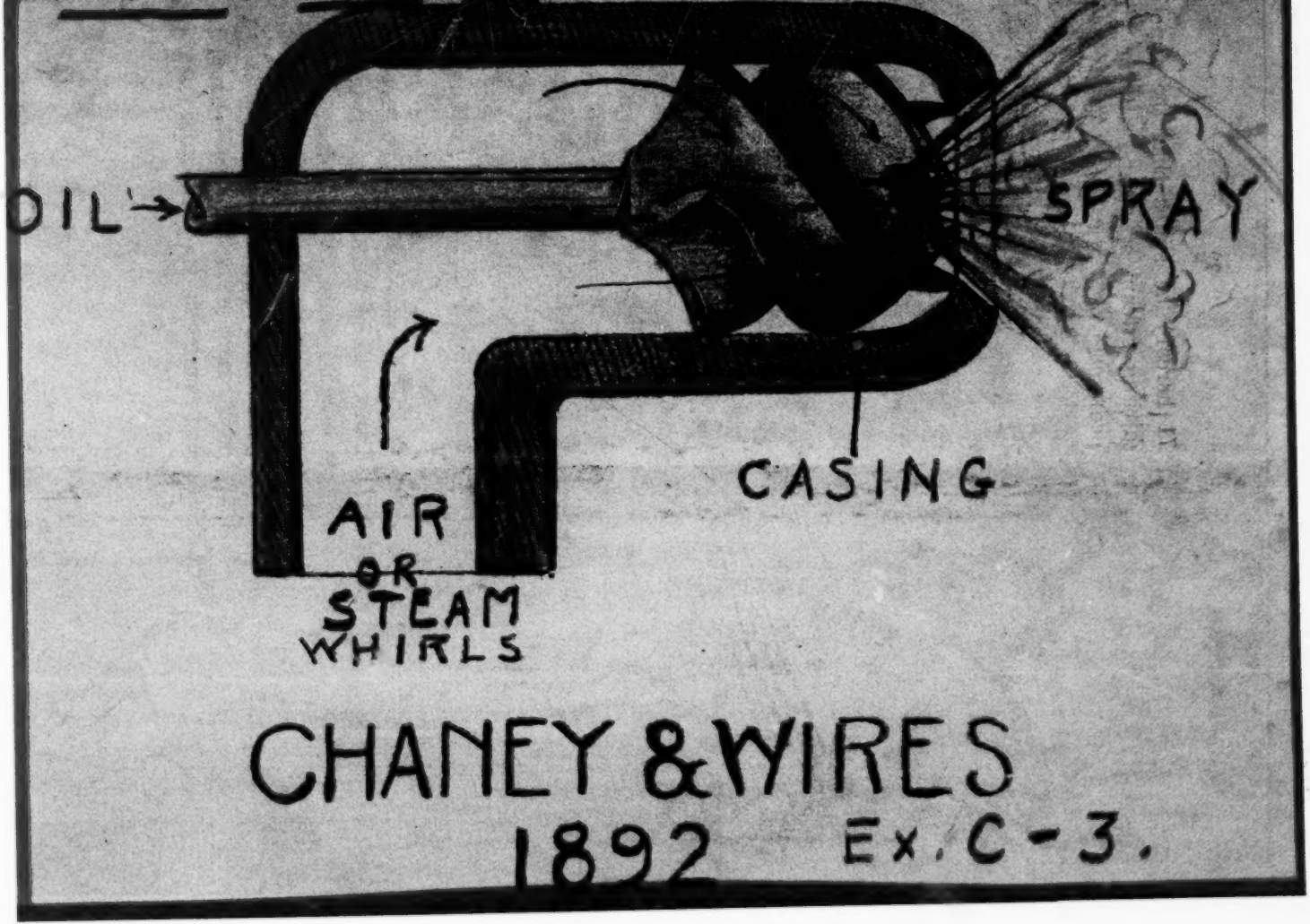
> Applicant has found that only by *concentrating a violently* whirling stream of gas at the *apex* of a cone-shaped *film of liquid* and thus bringing into play powerful centrifugal forces can the heavier liquid be thrown to the outer strata of the stream of gaseous fluid. (Italics ours.)

All of which confirms the contention again repeated that it is the peculiar structure of Appellants integral casing 17 in cooperation with the other parts of his atomizer forming a VITAL AND INDISPENSABLE PART OF THE COMPLETE ATOMIZING NOZZLE THAT CONSTITUTES ANYTHING NOVEL WHATEVER IN HIS WHOLE COMBINATION, AND IT CLEARLY WAS HIS EMPHASIS ON THIS THAT RESULTED IN THE FINAL ALLOWANCE OF HIS PATENT.

That is his alleged gift to the public, and if it were in fact new and therefore a gift, then anyone using that *PARTICULAR* structure in that particular combination performing those particular functions might infringe.

It is to be noted particularly that in setting forth his fourth element which we have just discussed

(pp. 67–71 hereof) he states that the function of the whirling stream of steam, air, or other gaseous medium is to "*penetrate*" the "*film of oil*" issuing from the oil nozzle. This is emphasized for the reason which will be presented more at length later, that in order to come within the terms of his claim even as clearly limited to the casing 17, the steam must be made to "*penetrate*" the *oil film,* and in this connection it must not be lost sight of that there is a great difference between an oil *film* and an oil *spray,* the former being a film or sheet of particles of oil in relatively close contact and *unbroken,* whereas the oil *spray* is a fine mist into which the film of oil has already been broken by its rapid motion in both a rotary and rectilinear direction. The "film" is that part of the cone issuing from the orifice of the oil nozzle that *retains its liquid structure at the apex,* before the tenacity of the particles has been so overcome by the whirling and rectilinear motion that it breaks into a spray or mist or fog; this film or liquid portion extends for about one-quarter to one-half inch from the oil orifice, when it becomes disintegrated into the spray. Stilz breaks up or *atomizes the film at its apex* as it issues from the oil nozzle and *inside his atomizer casing 17* by his *violently* rotating *steam,* thus forming a spray which he *then* mixes with air for combustion. (Appellee allows the film to break up by its *own motion into a spray* and *then* mixes with this spray a rela-



CHANEY & WIRES

1892 Ex. C-3.

tively *mildly* moving current of air for combustion entering through the air register.)

While leaving the argument as to the novelty of this fourth element, which is the only possible novel feature of his whole patent, to the later discussion under the head of "Validity," etc., attention is briefly invited to the fact that this very allegedly novel fourth element of—

> means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil—

was old when Appellee claims to have invented it and is shown in substantially identical form and having the same function, mode of operation, and result in the patents to Armstrong (Exhibit C–12), (see illustration p. 108) Pages (Exhibit D–2), (see illustration p. 106) Lee (Exhibit C–14), (see illustration p. 106) Kermode (Exhibits C–8 to C–11), (see illustration p. 104) Billow (Exhibit C–7), (see illustration p. 84) Moore (Exhibit C–5), Chaney and Wires (Exhibit C–3), (see illustration p. 72) Anthony (Exhibit D–9), and others referred to later.

On page 1 of his patent No. 1066161, lines 103 to 109, inclusive, Appellant explains that he, under certain conditions, may shut off the steam for atomization and operate only with the air for combustion. But when so operating he has nothing more than the well-known mechanical atomizer shown in many prior art structures and admitted

by him to be old; hence, by his own showing his invention, if there be any, is the *particular device* accomplishing steam or gaseous atomization, as shown in his figures 3 and 4, for it is only in that that he shows anything even purporting to be new. He therefore can not now contend that that feature is immaterial, or that a device not utilizing that feature is an infringement. (*Grever* v. *U. S. Hoffman Co.*, 202 F. 923; *Goodyear* vs. *Davis*, 102 U. S. 222 at 227 and 228; *Weber Electric Co.* vs. *Freeman Electric Co.*, 256 U. S. 668–677; *Shepard* vs. *Carrigan*, 116 U. S. 593–598; *Hubbell* vs. *U. S.*, 179 U. S. 77–80–82; *Sargent* vs. *Hall Safe Co.*, 114 U. S. 63; *Fay* vs. *Cordesman*, 109 U. S. 408; *Knapp* vs. *Morss*, 150 U. S. 221–227; *Morgan Envelope Co.* vs. *Albany Paper Co.*, 152 U. S. 425–429.)

In conclusion on this point it is pointed out that if the Stilz claim should be broadly construed, according to his contention, so as to cover a structure similar to defendant's in which the furnace box or register encloses and admits whirling air for combustion only to the entrance into a restricted furnace orifice, and this register is held to be equivalent to Stilz's specifically described casing 17—then that is shown in the Meyer patent (Exhibit C–13), the Laing patent (Exhibits D–6 and D–8), illustrated at page 54 hereof, the Bevis patent (defendant's Exhibit D–5), illustrated at page 84 hereof, the structure of the " Norfolk test " (defendant's Exhibit C–17), illustrated at page 78 hereof, and the Normand burners used on the " Paulding "

and shown in Exhibits D–4 and D–7. (See illustrations opposite page 80.) It is then *only* by structurally adding his peculiar casing 17 to the old atomizer that Stilz has given anything having even the semblance of novelty to the public and *that* is not new, as we have pointed out and will later more fully demonstrate.

Without taking the time of the court to again analyze at length claims 6 and 1—the other two remaining claims at issue—it is to be said claim 6 is identically the same as claim 7, except that it does not make a part of the combination the second element of claim 7; that is to say, the lining of refractory material for the hole, which of course was well known and old, as has been already pointed out in the foregoing analysis of claim 7, and its omission could neither broaden claim 6 nor affect the question of what alleged invention claim 6 really covered.

A short discussion of claim 1 appears to be advisable to the extent of pointing out that this claim is more specific than claims 6 and 7, already discussed, and is for a steam or air atomizer *per se* made specifically in accordance with the drawings and description of the specification. It is further limited in like manner to the peculiar structure in which the oil nozzle must have "a small discharge orifice," but this is shown in Laing (Exhibits D–6 and D–8), Bevis (Exhibit D–5), Meyer (Exhibit C–13), Armstrong (Exhibit C–12), Lee (Exhibit C–14), Schutte (Exhibit C–2), and Pages (Ex-

hibit D–2), besides the Normand burners used on the "Paulding," and the structure of the "Norfolk test" (Exhibit C–17). The

> "means immediately adjacent to said orifice for producing a whirling motion in the liquid fluid passing therethrough"

are likewise shown in the above-mentioned exhibits.

> "A casing surrounding said nozzle and having a restricted discharge port concentric with said orifice, and means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current"

is found in Kermode (Exhibits C–8 and C–11), Armstrong (Exhibit C–12), Lee (Exhibit C–14), Schutte (Exhibit C–2), and Anthony (Exhibit D–9). (See index of illustrations of these patents.)

So that this claim, *unless it be limited to the exact form described and illustrated in the drawing, clearly lacks novelty* (Clough v. Barker, 106 U. S. 166 at bottom of page 176 and top of page 177), and even if so limited is void for the same reason and because clearly anticipated by structures in the prior art, as will be more at length demonstrated later on.

It is evident, we think, from what has preceded that the Court of Claims was correct in its opinion found on page 15 of the transcript of record, where it said:

> "We have been unable after mature deliberation to escape the conclusion that the

> plaintiff's claims to invention may not, under the law, be accorded a wider scope than the bringing into existence of improvements to a device old in the art, well known to the public, and in settled use."

On this question of the interpretation and scope of the claims of patent 1,066,161, the opinion of the Circuit Court of Appeals for the Second Circuit involving this patent in a suit by this Appellant against the Babcock & Wilcox Co. is of interest and we think convincing. The alleged infringing device was that shown at page 82 hereof and page 22 of appellant's brief herein. This opinion is not yet reported, but is printed at length as an appendix to this brief, and on page 121 the court by Judge Manton says:

> " The oil did not leave the inner orifice in the conical spray. It has not broken into a spray at this time—it is a continuous liquid cone. If it were a spray, the steam would escape through part of the orifice 19 without producing any effect on the oil. After the oil is atomized, it is impossible to break up the drops. The atomizing *steam must be directed at a point on the conical film of oil emerging from the mechanical atomizer at 14 before the oil has traveled far enough to break into any kind of a spray and the orifice must be restricted to the size of the outlet in 14 in order that the oil film will be caught by the rotating steam to be perfectly atomized.* Outlet port 19 is therefore restricted and the *casing 17 surrounding the nozzle is*

provided for. In other words, port 19 is made small enough so that the mechanical oil film will fill it and act like a valve to prevent the escape of the steam without penetrating the film so that it may be atomized.

In claims 1 and 5 this restricted discharge port means a small opening 19 somewhat larger than the small discharge orifice 14 of the nozzle 12 and in a casing 17 surrounding said nozzle, that is, *so close to it that the gaseous fluid (steam) will be directed into the conical film emerging from the small discharge orifice.* In claims 6 and 7 these elements are described as means surrounding the nozzle for producing a whirling stream of the gaseous fluid (steam and compressed air) directed so as to *penetrate said film of oil, while the hollow cone-shaped film of oil is issuing from the orifice 14 in a nozzle 12.* IT THUS APPEARS THE INVENTION IS LIMITED STRICTLY ON THE FACE OF THE PATENT TO THE STRUCTURES SHOWN IN THE DRAWINGS. (Italics ours.)

THIRD

NONINFRINGEMENT

What Appellee has done and does—Appellee merely utilizes what was already in its possession of the prior art—That which would not anticipate if earlier will not infringe if later—Identity of Appellee's devices with the prior art—The burden is on the Appellant to show infringement.

As early as 1901, the Navy Department made a series of tests of oil burning devices for use on ships

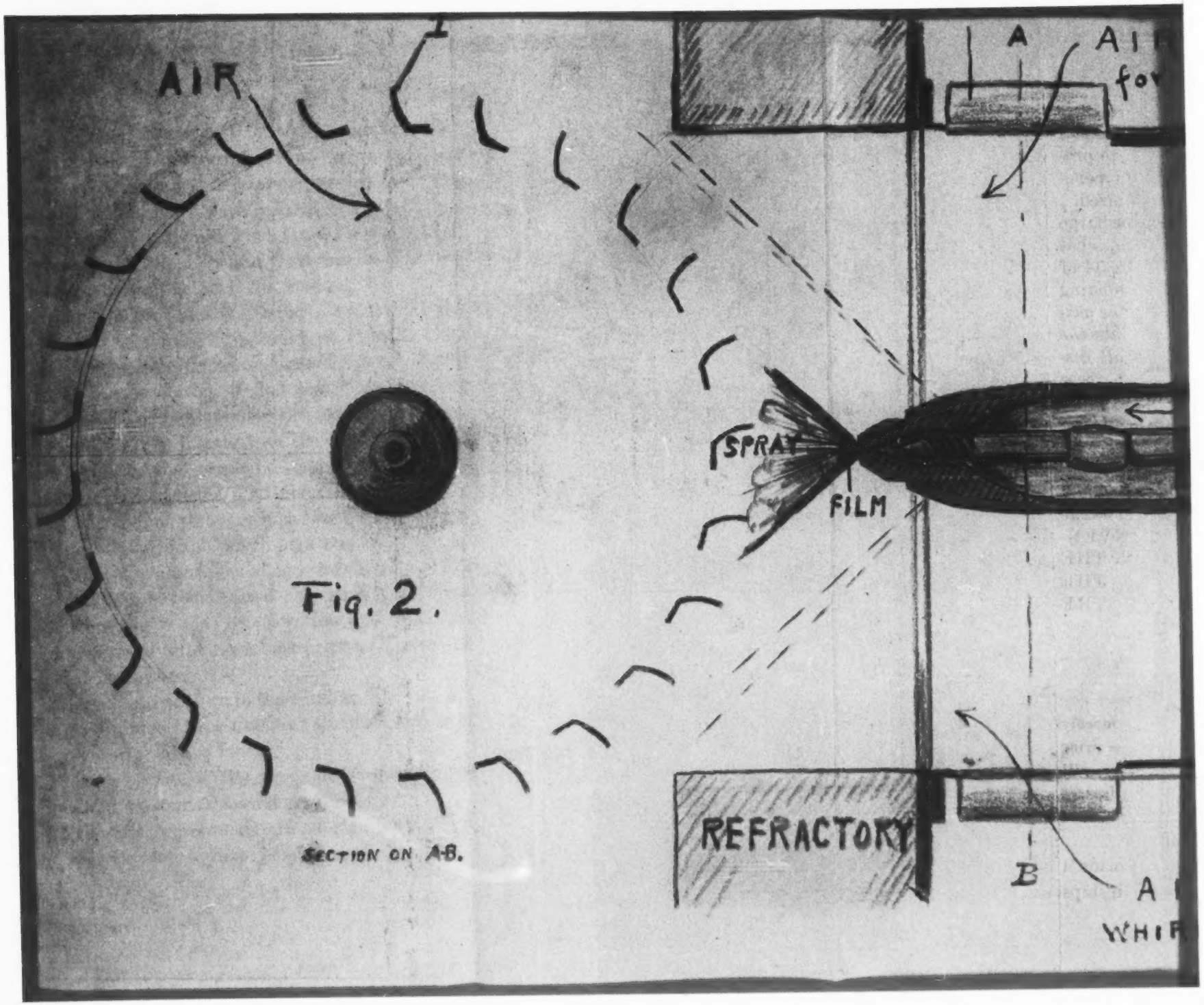
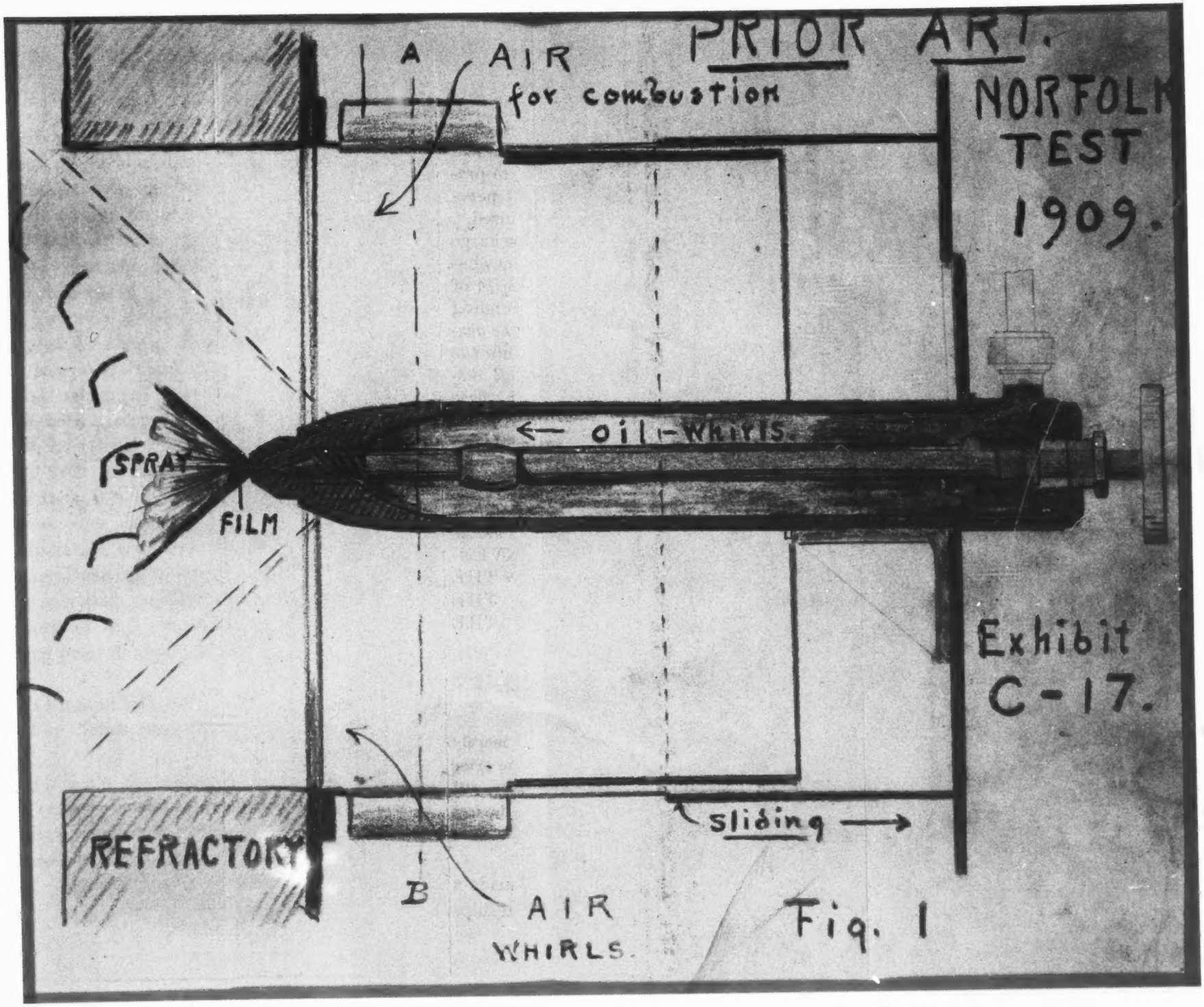


Fig. 2.

SECTION ON A-B.


PRIOR ART.
A
AIR
for combustion
NORFOLK
TEST
1909.
oil-whirls.
SPRAY
FILM
Exhibit
C-17.
sliding
REFRACTORY
B
AIR
WHIRLS.
Fig. 1

of the Navy, the results of which, together with illustrations and descriptions of various devices and installations of both steam atomizers and "mechanical atomizers" were printed in a publication known as the "Liquid Fuel United States Naval Report," published by the Government Printing Office in 1904 (Exhibit C–10, Finding V).

In 1907–1909, the Navy Department devised and tested the structure illustrated in Exhibit C–17 (see illustration opposite page 78); thereafter and as a consequence of that test it rejected the steam atomizer and adopted the mechanical atomizer and in 1910 installed on its vessels *Paulding* and *Drayton* the Normand type of mechanical atomizer and register, (Exhibits D–4 and D–7), (see ilustration, p. 80) which were substantially identical in principle and operation with the devices that appellant now alleges infringe upon his patents; and has since used only such mechanical atomizers, the modes of operation and functions of which were well known long prior to appellant's alleged inventions.

This is clearly shown in the Finding VII and XI, and the opinion of the Court of Claims, page 15 of the transcript of the record.

Identity between the Appellee's devices and Appellant's patents does not exist, because:

If the effects produced are substantially different, there is no indentity; hence no infringement.

79

Even if the effects are the same but the functions essentially distinct, there is no identity; hence no infringement.

Even if the functions are the same but the modes of operation by which they are performed are radically unlike, there is still no identity; hence no infringement. (3 Robinson on Patents, sec. 894, p. 48; *Cimmiotti, &c.*, v. *Amer. Fur.*, 198 U. S. 399–414; *Barley* v. *Witt & Co.*, 216 Fed. 77.)

> Where changes of size, form, or location effect a change in the principle or mode of operation, such as breaks up the relation and cooperation of the parts, this results in such a change in the means as displaces the conception of the inventor and takes the new structure out of the patent. (*Cimmiotti, &c.*, v. *Fur. Co.*, 198 U. S. 399, at 414; *Kokomo* v. *Kitselman*, 189 U. S. 8.)

The object, structure, function, mode of operation, and results of the Appellant's devices, as disclosed in the patents, must be kept in mind in determining whether or not Appellee infringes on Appellant's patents, assuming them to be valid, *for, though the claims may read upon Appellee's structures, and the latter come literally within the terms of the claims, there may be no infringment. The* " law of the machine " is to be kept in mind. (*Burroughs Adding Machine Co.* v. *Felt & Tarrant*, 243 Fed. 861; *Standard Tobacco Co.* v. *Tobacco Stemming Co.*, 237 Fed. 822, 827; *Goodyear Shoe Machinery Co.* v. *Spaulding*, 101 Fed. 990; *Edison* v.

American, &c., 151 Fed. 767, 773; *Curtis* v. *Cramp,* 211 Fed. 124, 135; *Westinghouse* v. *Boyden,* 170 U. S. 537–568.)

In discussing the device used by the Government alleged by appellant to infringe upon his patents in suit, we shall confine ourselves to those specified by appellant in his brief, and illustrated therein on pages 21 and 22.

These are illustrated opposite page 82 hereof and the illustrations are substantially the same as appellant's, except that the numerals which he has applied to the respective parts, and which he has, without foundation taken from the drawings of his patents where they are applied to dissimilar parts, are replaced by letters merely designatory of the parts for the purpose of explanation.

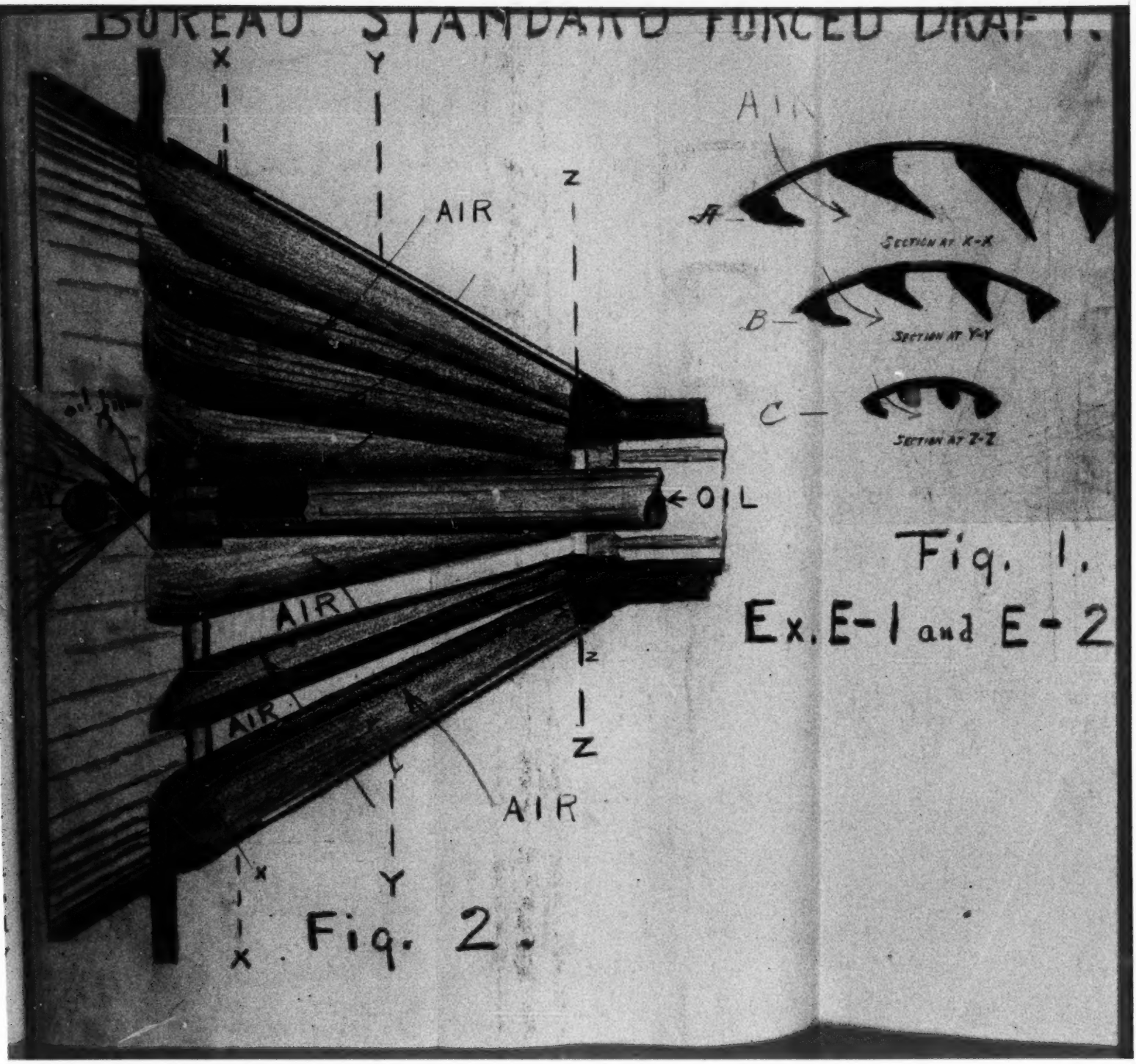
Opposite page 82 is the Government's so-called "Bureau Standard Forced Draft Burner," set forth in Finding VII (par. 1, as Exhibit E–1) of the Court of Claims, which is similar to E–5 and E–6, and corresponds (with the exception of the numerals of parts) to appellant's Fig. A on page 21 of his brief.

Opposite page 82 is the Government's so-called "Bureau Standard Natural Forced Draft Burner," set forth in Finding VII, par. 2, as Exhibits E–3 and E–4, and corresponds with the same exceptions as to numerals to appellant's Fig. C, page 21 of his brief.

Oposite page 82 is the Government's burner manufactured by the Babcock & Wilcox Co., set forth in Finding VIII, paragraph 4, and there called " Peabody register and burner " Exhibit E–7, and corresponds with the same exception as to numerals to appellant's Fig. D on page 22 of his brief.

Appellant's object is to provide a device that will assist in atomizing a cone of oil both by the application of heat and particularly by the breaking up the *cone of oil* immediately on issuing from the oil orifice, by the impact on and penetration of that *oil cone* by a jet of violently whirling steam or other gaseous medium. This he accomplishes through the peculiar and specific apparatus or means indentified as his casing 17, forming an integral part of his atomizer nozzle, which leaves a narrow, shallow mixing chamber 18 in which the steam is confined and violently forced into the cone of oil before it becomes a *spray,* and which *causes* it to become a spray, as has been before exhaustively pointed out.

Appellee found the use of steam or other gaseous medium for atomization unnecessary and unadvisable, because, first, the oil could be satisfactorily heated before passing into the nozzle to be atomized; second, because steam or air under heavy pressure required heavy and expensive apparatus or a waste of water, and third, because results were no better than those secured by plain mechanical atomization employing, as all burners must, be they steam or mechanical, air for combustion.


BUREAU STANDARD FORCED DRAFT.
X
Y
Z
AIR
AIR
AIR
AIR
OIL
A
B
C
SECTION AT X-X
SECTION AT Y-Y
SECTION AT Z-Z
Fig. 1.
Ex. E-1 and E-2
Fig. 2.

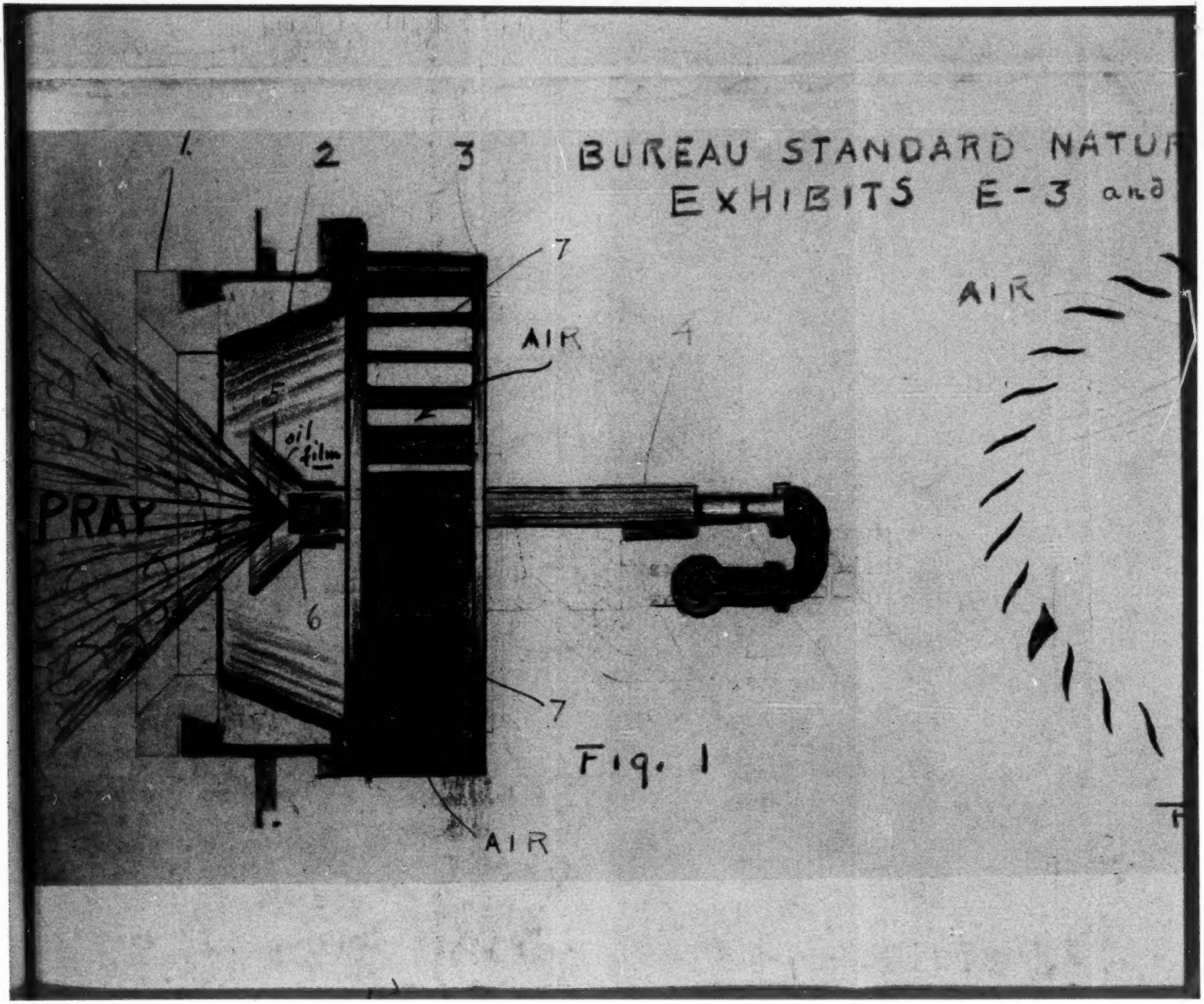

1
2
3
BUREAU STANDARD NATUR
EXHIBITS E-3 and
7
AIR
AIR
oil film
PRAY
6
7
AIR

Fig. 1

BUREAU STANDARD NATURAL FORCED DRAFT.
EXHIBITS E-3 and E-4

Fig. 1

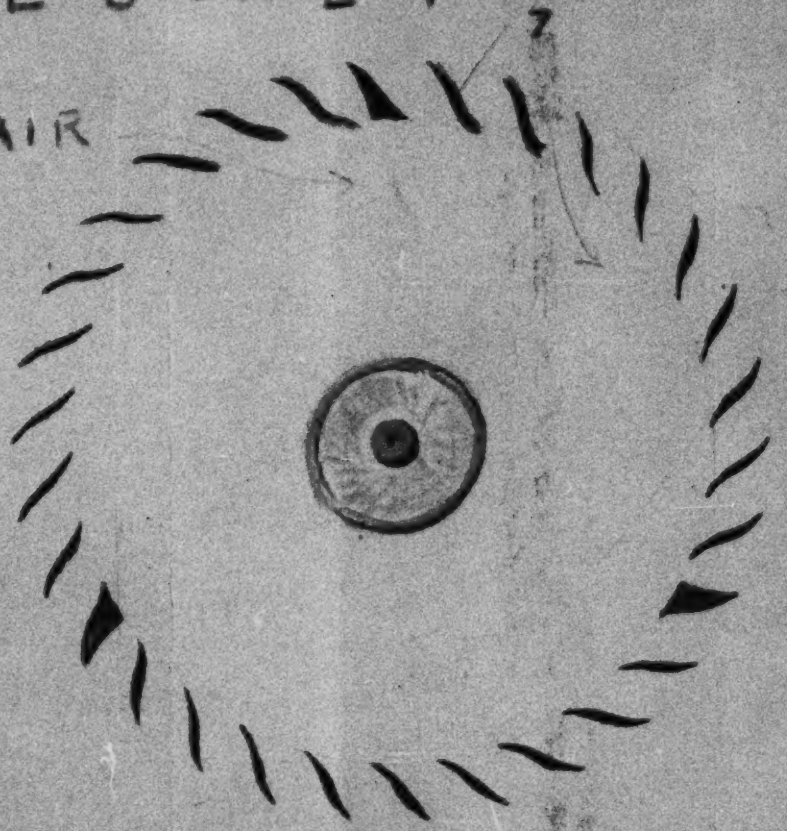
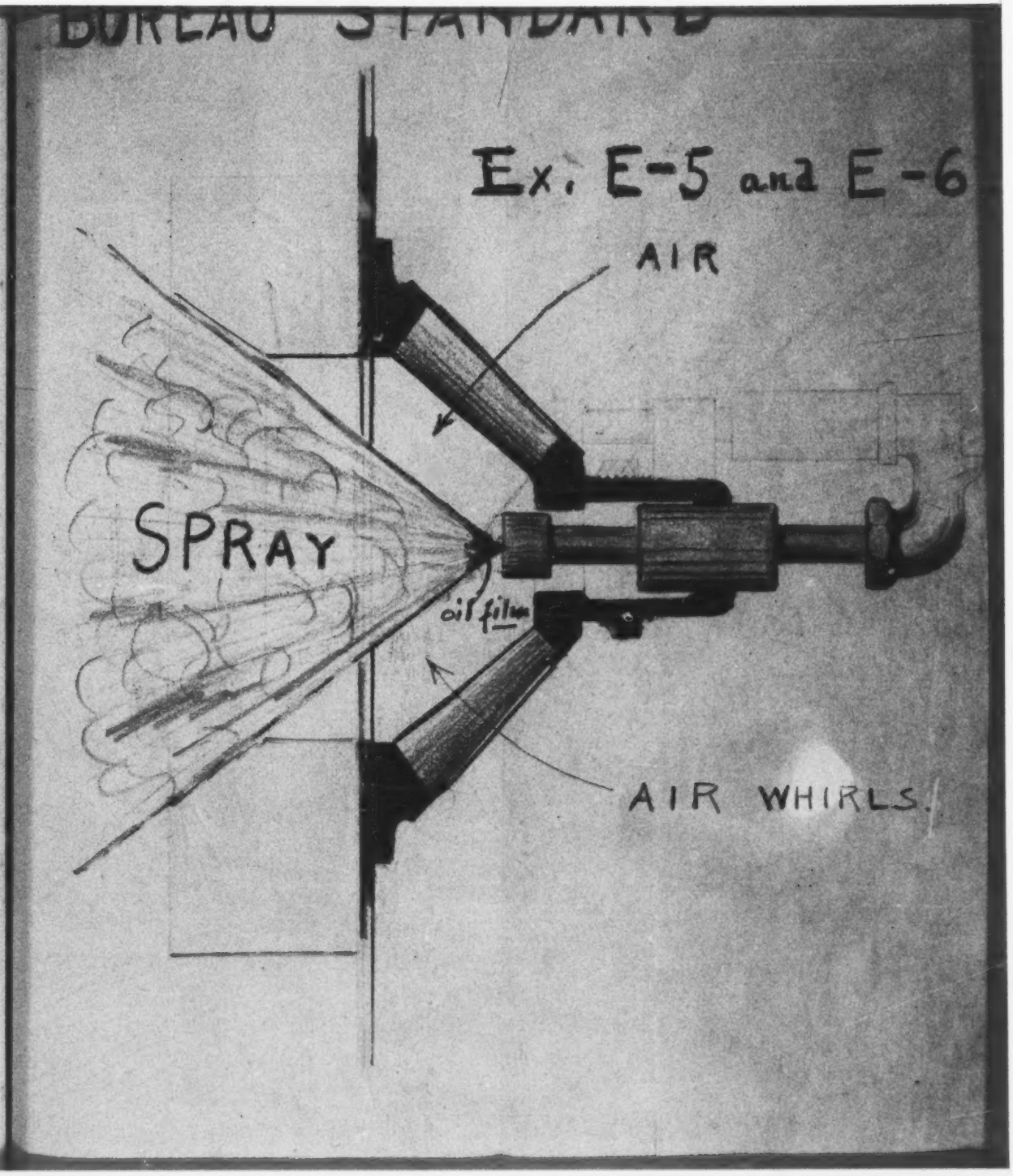


Fig. 2.


BUREAU STANDARD
Ex. E-5 and E-6
AIR
SPRAY
oil film
AIR WHIRLS.

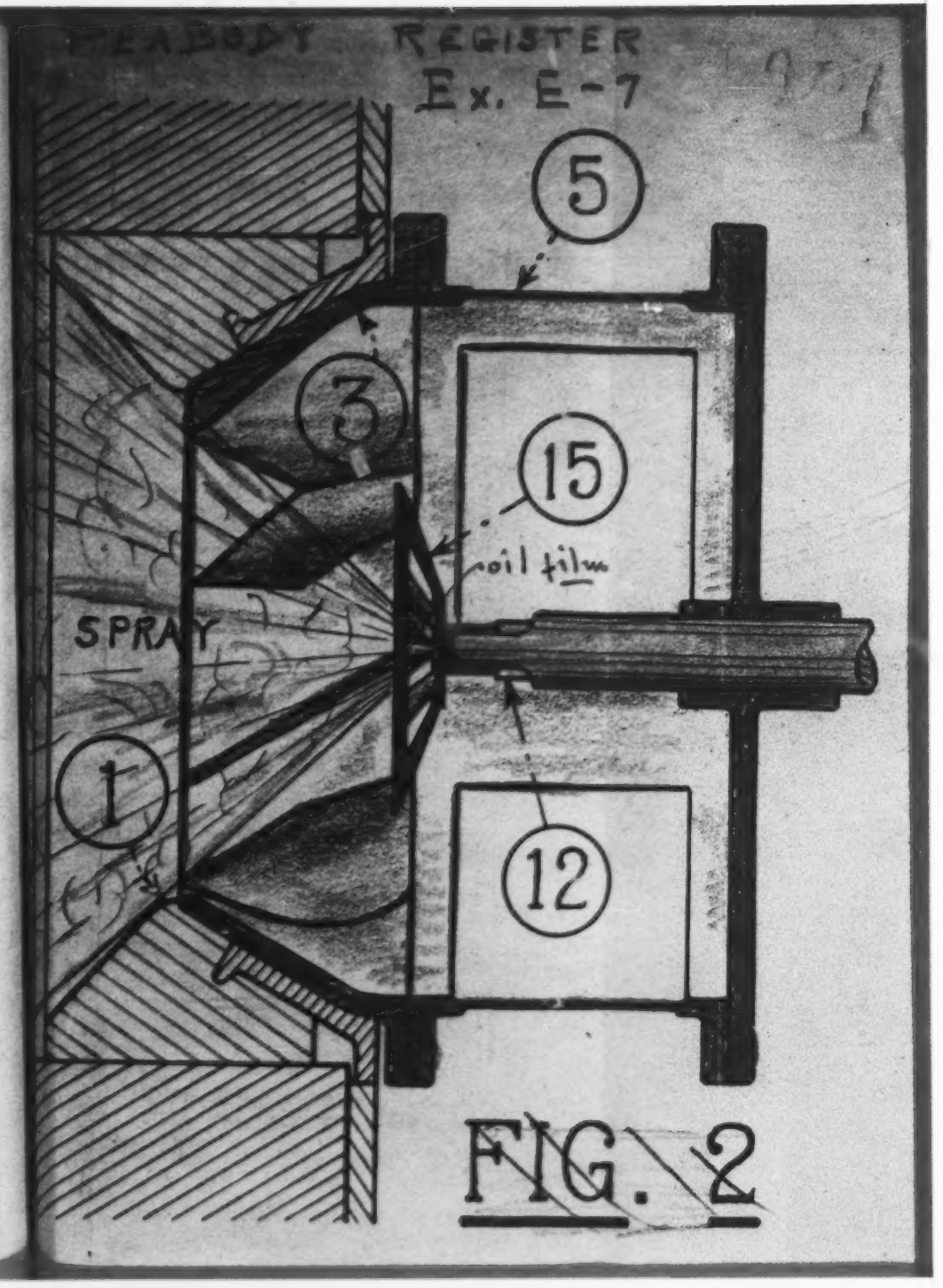


FIG. 2

Appellee does not utilize either the structure, the principle, the function, the mode of operation, nor obtain the result set forth by complainant in his patents. Appellee utilizes, and long before Appellant's patents were granted did utilize, old and well-known means or structures operating on different principles, performing different functions by different modes of operation and attaining a different result. Appellee's object is to atomize the oil *mechanically* into a cone of *spray* and to mix with the *spray* so atomized a *mildly* moving current of air for combustion.

In order to show the difference it is pointed out that Appellee omits all atomizer "casings" or chambers in which steam, air, or other gaseous medium is brought into contact in any way so as to *atomize the oil or assist in atomizing it.*

Appellee atomizes the already heated oil by the well-known methods shown in—

Schutte (Exhibit C–2; see illustration opposite p. 52).

Bevis (Exhibit D–5; see illustration opposite p. 84).

Laing (Exhibits D–6 and D–8). Illustrated page 54.

Meyer (Exhibit C–13).

Liquid fuel report (Exhibit C–10, p. 231).

The device employed in the Norfolk and New York tests (Exhibits C–15 and C–17). Illustrated page 78.

The publication Engineering (Exhibit C–16).

Appellee introduces air only for combustion through ports or openings of the register, as well known and shown in the patent to Billow (Exhibit C–7; see illustration p. 84); publication Engineering (Exhibit C–16), and whirls this air as shown in the following publications:

Normand (Exhibits D–4 and D–7; see illustration opposite page 80).

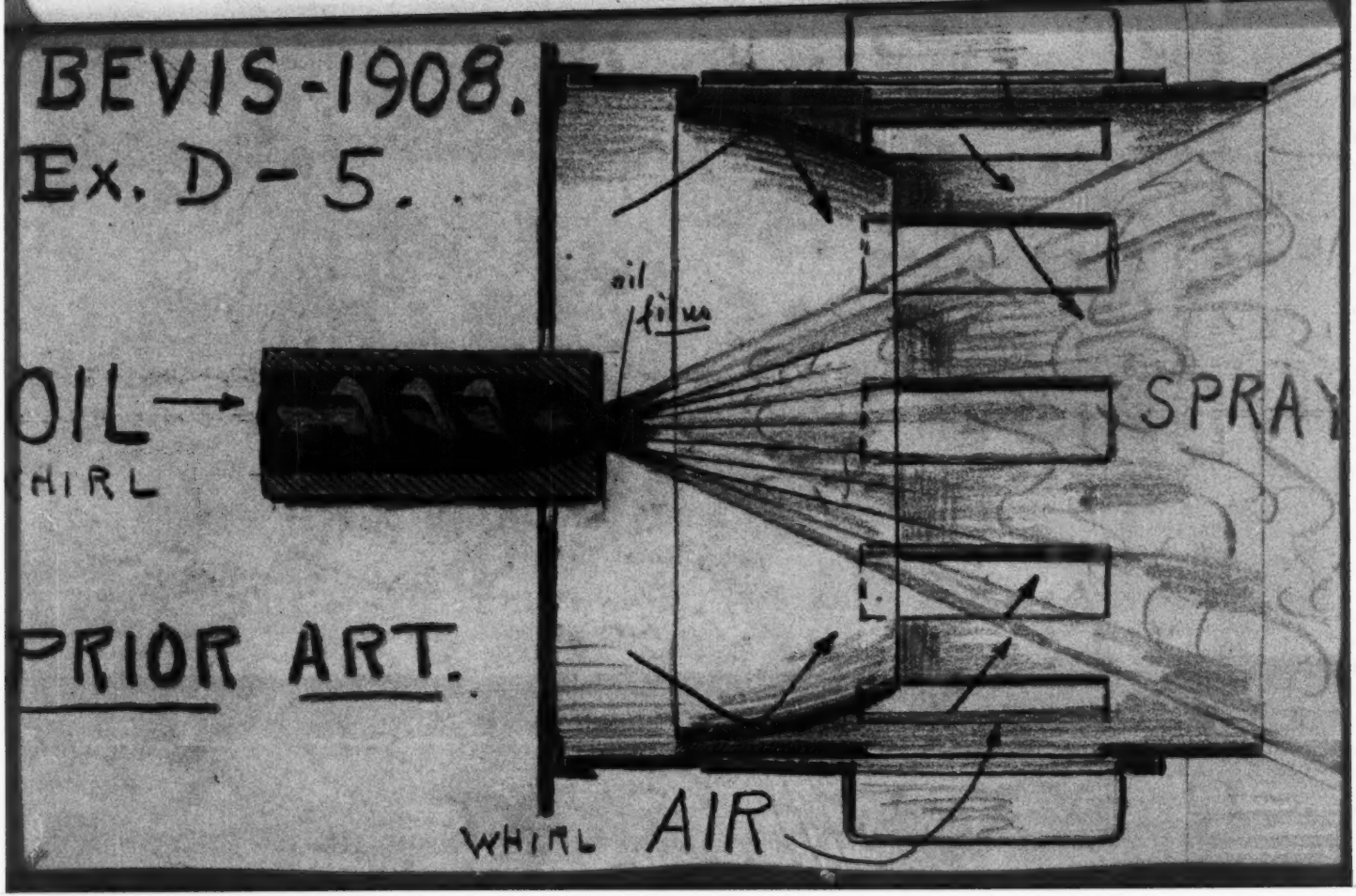
Bevis (Exhibit D–5; see illustration page 84).

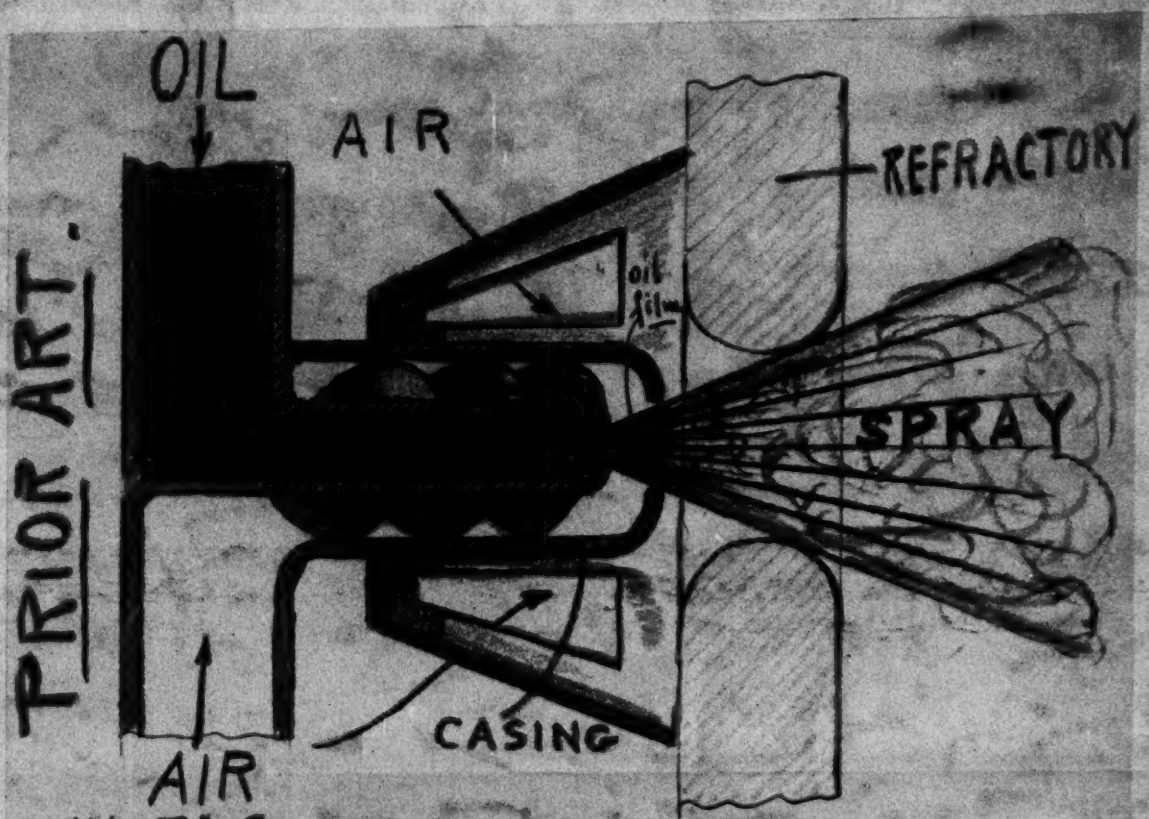
Meyer (Exhibit C–13).

Laing (Exhibits D–6 and D–8; see illustration page oposite 54).

Apparatus used in the Norfolk and New York tests. (Exhibits C–15 and C–17—above referred to; see illustration opposite page 78.)

Appellee directs its mixture of air and *oil spray* through the furnace hole having a refractory lining, shown in the above-mentioned patents to Billow, Bevis, Laing, Armstrong (see illustrations of said patents on pages above mentioned and referred to in list of illustrations) and Meyer, the Norfolk test, the Journal of American Society Naval Engineers, Liquid Fuel Report, and the publication Engineering. This furnace hole is also usually restricted or somewhat smaller than the largest diameter of the register, which feature is also shown in Laing, Meyer, Billow, Corneuve, Liquid Fuel Report (p. 231), and Engineering.

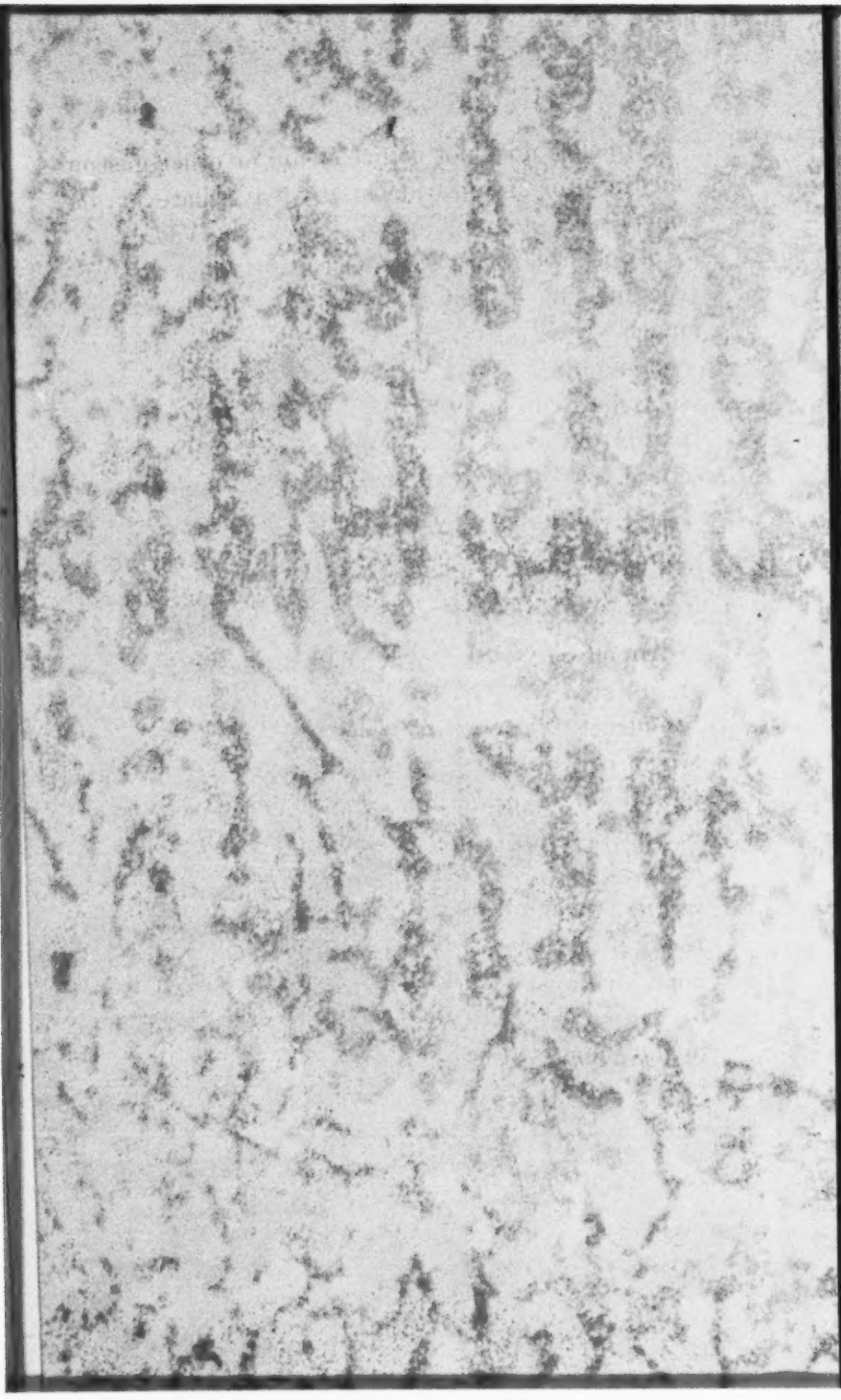

BEVIS-1908.
Ex. D-5.
oil film
OIL
HIRL
SPRAY
PRIOR ART.
WHIRL AIR



PRIOR ART.

BILLOW-1899

Ex. C-7



Appellee does not utilize steam or other gaseous medium for atomization in any way whatever; has never used steam atomizers. Finding VII.

Appellant in his specification, claims, and proceedings in Patent Office, Exhibit B–1, has laid much stress on the fact that in *his* invention the steam or air "penetrates" his oil *film* or cone, so assisting in atomizing it, and, as has been shown, points out that this penetration can only be secured by—

> concentrating a violently whirling stream of gas at the apex of the cone of oil. (See p. 54 hereof, quoting from file wrapper and contents, paper No. 23, p. 4, Exhibit B–1.)

Appellee's air for combustion only, introduced in its structures through the air *register,* is *not* "violently" whirling; is under a relatively very slight pressure; while Appellant's atomizing gas is at a very *high* pressure; and Appellee's air for combustion does not "*penetrate*" the *cone* or *film of oil* at the apex or elsewhere *nor assist in atomizing it,* but merely mixes with the "*spray*" of already atomized oil just prior to entering the furnace, in the same manner as was constantly done by prior devices shown in the art and referred to in the court's Findings V and VI.

PARALLEL COMPARISON OF APPELLANT'S AND APPELLEE'S STRUCTURES AND MODES OF OPERATION

Appellant's	Appellee's
1. Is a steam atomizer.	1. Is a mechanical atomizer.
2. Atomizer embodies a casing forming a steam and oil-mixing chamber immediately surrounding oil nozzle and integral with it.	2. Atomizer consists wholly of an oil nozzle, without any casing or mixing chamber connected with oil nozzle.
3. Steam within casing violently impinges on and penetrates oil cone at its apex atomizing it.	3. Uses no steam or gaseous fluid for atomization. Atomization caused by pressure and rotation of oil as it issues from nozzle.
4. Employs an air register for supplying air for combustion to the furnace, which air mixes with oil spray.	4. Air for combustion enters register in mildly moving current and mixes with oil spray.

Considering in detail the Appellee's structures alleged by Appellant to infringe, and set out in the lower court's Findings VII, Exhibits E–1 and E–2, shown in the illustration opposite page 82 hereof, represents an early form of atomizer and burner used by the Navy Department and developed by it about 1912.

Appellant's patent 1066161, which this structure is alleged to infringe, is dated July 1, 1913; that is to say, a year later. The construction, function, mode of operation, and results attained by this structure are substantially different from either of those of complainant's patents: *First,* it is not a steam or air atomizer, but a mechanical

atomizer, using no gaseous medium whatever for atomization, but only admitting air for combustion. See Court of Claims Finding VII. *Second,* it has no " casing surrounding the oil atomizer having a restricted discharge port and means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current," such as is clearly an essential feature of the patent 1066161 and constitutes the third and fourth elements of claim 1. *Third,* the air for combustion does not penetrate the *oil cone or film* so as to assist in breaking it up by a " violent " action due to high pressure and impinging upon it at the apex, but entering as a relatively mild current merely mixes with the spray of already atomized oil to aid combustion only, and has no effect on the atomization. Finding VII.

Exhibits E–3 and E–4 (see illustration, opposite p. 82 hereof) showing Appellee's burners, are different exhibits of the same device. This is also a common mechanical atomizer, not utilizing steam, air, or other gaseous medium for atomization in any way whatever. Court of Claims Finding VII.

The air entering through the register does not atomize the *oil film or cone,* as does the atomizing agent of complainant, but is used to mix with the oil *spray* already atomized, solely for the purpose of combustion. Finding VII. The structure contains no casing surrounding or forming a part of

the atomizer such as is shown in Appellant's patents, and is incapable of functioning like his device; nor does it operate by the same method or attain the same results.

Exhibits E–5 and E–6 of Appellee's structures are different exhibits showing the same device and are substantially the same as Exhibits E–1 and E-2 already discussed on page 86. They show a common mechanical atomizer not utilizing steam, air, or other gaseous medium for atomization. The air entering through the register is only for combustion and does not penetrate or assist in atomizing the oil. Court of Claims Finding VII. It also has no casing forming a part of the atomizer such as is shown in complainant's patents and has a different function, mode of operation, and result.

Exhibit E–7, page 82 hereof, of Appellee's structure is also similar to Exhibits E–3 and E–4. It is a common mechanical atomizer NOT utilizing steam, air, or other gaseous medium for atomization. Court of Claims Finding VII. It likewise has no casing like that of complainant's patents and can not function like complainant's device; nor operate by the same method; nor produce the same result. It is a fact that the testimony of the witnesses for both Appellant and Appellee was emphatic as to the dissimilarity between structures of Appellee and those shown in the Patents in suit. And also as to the difference in modes of operation and functions. Finding VII of the court below resulted therefrom.

In short, defendant's structures employ only elements OLD AND WELL KNOWN, ANTEDATING COMPLAINANT'S PATENTS IN SUIT, AND DO NOT EMPLOY SPECIFIC STRUCTURES OR ALLEGED INVENTIONS OF COMPLAINANT CLAIMED OR ILLUSTRATED, OR ANY EQUIVALENT THEREOF.

In the case of *Westinghouse* v. *Boyden,* 170 U. S. 537, *supra,* the court says, on page 568:

> But even if it be conceded that the Boyden device corresponds with the letter of the Westinghouse claims, that does not settle conclusively the question of infringement. We have repeatedly held that a charge of infringement is sometimes made out, though the letter of the claims be avoided. (*Machine Co.* v. *Murphy,* 97 U. S. 120; *Ives* v. *Hamilton,* 92 U. S. 426, 431; *Morey* v. *Lockwood,* 8 Wall. 230; *Elizabeth* v. *Pavement Co.,* 97 U. S. 137; *Sessions* v. *Romadka,* 145 U. S. 29; *Hoyt* v. *Horne,* 145 U. S. 302.) The converse is equally true. The patentee may bring the defendant within the letter of the claims, but if the latter has so far changed the principle of the device that the claims of the patent, literally construed, have ceased to represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted when he has done nothing in conflict with its spirit and intent. "An infringement," says Mr. Justice Grier, in *Burr* v. *Duryee,* 1 Wall. 531, 572, "involves substantial identity,

> whether that identity be described by the terms, 'same principle,' same '*modus operandi*,' or any other. * * *. The argument used to show infringement assumes that every combination of devices in a machine which is used to produce the same effect is necessarily an equivalent for any other combination used for the same purpose. This is a flagrant abuse of the term 'equivalent.'"

Therefore, even if the terms of Appellant's claims did read upon and even literally cover the Appellee's structures, still this is no indication of infringement of Appellant's invention, which may be, and in this case palpably is, essentially different from the structure and principle utilized by Appellee.

The fact is not to be lost sight of that Appellant in his argument before the examiner as shown in the file wrapper and contents of his application for patent 1,066,161 (Exhibit B–1; see paper No. 20), distinguishes his structure from Schutte (Exhibit C–2) and Laing (Exhibits D–6 and D–8), and says that they do not show—

> means for penetrating a cone-shaped film of oil with the gas,

and for this reason claims they are not anticipations of his invention; and in argument before the Board of Examiners repeats this argument, saying further that, as regards Schutte—

> Nor by any stretch of the imagination can it be converted into one (a burner) using a

> gaseous fluid to assist in the atomization. (Parenthesis ours.)

But both the Schutte and Laing patents disclose absolutely the principles, functions, mode of operation, and substantially the structures utilized and followed by Appellee. Therefore, if these patents are so different from Appellant's invention that they will not anticipate it, Appellee's structures which are like them can not infringe, since the Supreme Court says:

> The rule is well established that "that which infringes if later would anticipate if earlier." (*Knapp* v. *Morss,* 150 U. S. 221–228; *Miller* v. *Eagle,* 151 U. S. 186; *Peerless* v. *White,* 118 Fed. 827, 835, C. C. A.; *Cleveland* v. *Chicago,* 135 Fed. 783, C. C. A.; *Peters* v. *Active,* 129 U. S. 530, 537; *Thatcher* v. *Burtis,* 121 U. S. 286, 295; *Grant* v. *Walter,* 148 U. S. 547, 554; *Gordon* v. *Warder,* 150 U. S. 47.)

And the converse or corollary in this case is equally true that—

> that which would not anticipate if earlier will not infringe if later.

Appellant contends that Appellee infringes because, as he claims, its air for combustion "*PENETRATES*" the cone or film of oil. (This is denied by Appellee); and Appellant argues that the register or box admitting air for combus-

tion is an equivalent of his atomizer " casing " 17; and that the space within the register where the air for combustion mixes with the *already atomized oil spray without further atomizing it* is the equivalent of Appellant's " shallow confined " space 18; and that the mild current of whirling air for *combustion* entering the register accomplishes the same function that his " violently "whirling atomizing steam does in his mixing chamber 18, and that the reduced diameter of Appellee's furnace hole is an equivalent of his restricted orifice 19. But even if his contention were correct, still these features are all shown in the patents to Laing (Exhibits D–6 and D–8), and substantially in Schutte (Exhibit C–2), neither of which, Appellant says, embodies and so anticipates his real invention. They are also shown in Meyer (Exhibit C–13), and Normand, Bevis, and the other exhibits of the prior art. If, therefore, Appellant's arguments on which he obtained his patent over the references were correct, and these references do not embody or anticipate his patents because they do not show in the case of the Laing patent—

> means for penetrating a cone-shaped film of oil with a gas,

and in the Schutte patent that it can not—

> by any stretch of the imagination be converted into one (a burner) using a gaseous medium to assist in atomization (parenthesis ours),

then Appellee's structures, which are like them in principle, mode of operation, function, and result, and closely follow them in structure, do not infringe. Appellee's devices are substantially identical with the other instances of the prior art cited.

Devices, though not claimed to fully anticipate a patent, are important in their bearing upon the construction of the patent, and upon an alleged infringement. (*Deering* v. *Winona,* 155 U. S. 286.)

If a defendant's devices are identical with the prior art and the patent is new, defendant's device can not be the same as complainant's alleged invention. (3 Robinson on Patents, sec. 1041, p. 306.)

> A patentee can not make an infringement of the thing from which he differentiated his invention in order to obtain his patent. (*Krupp* v. *Midvale Steel Co.,* 191 Fed. 588, 610.)

Another test of infringement required by the courts as determinative is that of interchangeability of parts. It may be briefly stated in the following language:

> Now, noninterchangeability of parts tends strongly to negative infringement. (*Miller* v. *Eagle,* 151 U. S. 186, at p. 208; *Pittsburgh Meter Co.* v. *Pittsburgh Supply Co.,* 109 Fed. p. 644, at p. 651.)

It is evident that the *non*atomizing air register of Appellee can not be substituted for the integral

casing 17 of *APPELLANT*, which *CAUSES* atomization by means of concentration of the violently whirling steam on the oil cone before issuing from the complete atomizer.

It may be repeated here that, assuming the validity of the patents, still Appellant is not entitled to a broad range of equivalents, so that even if Appellee's register and means for adding whirling air for combustion were really a mechanical equivalent for his casing 17, which, of course, is denied, he would not be entitled to prevent Appellee from using it, since he is limited to his specific form of atomizer nozzle, including the integral casing; moreover the functions are different.

> Where the margin of invention is very narrow, the doctrine of equivalents can not be invoked to make out infringement.
>
> *Doze* v. *Smith*, 69 F. 1002.
> *Muller* v. *Lodge*, 77 F. 621.
> *Miller* v. *Eagle*, 151 U. S. 186.
> *Wright* v. *Yuengling*, 155 U. S. 47.
> *Knapp* v. *Morss*, 150 U. S. 221.
> *Bragg* v. *Fitch*, 121 U. S. 478, 483.

Appellant introduced absolutely no evidence which shows infringement, other than his exhibits of Appellee's structures, which utterly fail to sustain his contention.

The burden is on Appellant to establish both the allegation of invention and infringement.

> *Mitchell* v. *Tilghman*, 19 Wall. 287.
> *Price* v. *Kelly*, 154 U. S. 669.

Appellant's argument in his brief (p. 22) referring to the appellee's structures illustrated in his drawings on pages 21 and 22, says:

> "The conical surface within the burner casing, leading to the restricted discharge port 19, drives the whirling current of air in towards its axis of rotation, thereby causing it to *penetrate* the oil film." (Italics ours.)

This is misleading and false, because the whirling current of mildly moving air introduced through the register only for combustion does not penetrate the oil film, which would result in atomizing—in other words, it does not mix with the oil as such before its atomization, but only with the oil *spray after atomization.*

The evidence to this effect was so conclusive that the court below expressly found:

> "No steam, air, or other gaseous fluid was introduced into or used in the burner proper for any purpose, nor used with any part of the equipment for the atomization of the oil, the air supplied through the air register encircling the burner proper being for supplying the oxygen necessary for the combustion of the oil." (Finding VII.)

Appellant's contention is further contradicted by his own statement during the prosecution of his application in the Patent Office quoted on page 57 hereof, which we repeat here:

> "The extremely rigid characteristics of a stream escaping from under a high pressure

> through an orifice are well known. To *penetrate* such a stream with a gas is *impossible by any ordinary means.* Applicant has found that only by concentrating a *violently* whirling stream of gas at the *apex* of a cone-shaped *film of liquid,* and thus bringing into play powerful centrifugal forces, can heavier liquid fluid be thrown to the outer strata of the stream of gaseous fluid. (Italics ours.)

In mechanical atomizers shown in the prior art, which Appellee follows, the air for combustion is mildly not " violently " whirling; by his own admission, therefore, it can not " penetrate " the oil film. This, in itself, distinguishes between the devices and negatives infringement.

On the question of infringement of the claims of patent 1,066,161 the opinion of Judge Manton, of the Circuit Court of Appeals for the Second Circuit, already referred to and to be found in the appendix of this brief, is pertinent and believed to be convincing. It refers particularly to one of the forms of burner also used by the United States, which appellant declares infringes his patent, but the reasoning applies equally to the other alleged infringing burners, except where it refers to a particular part peculiar to the so-called Babcock & Wilcox burner illustrated as Fig. D on page 22 of appellant's brief. Moreover, even if Appellant's contention were correct and the air for combustion in Appellee's structures is directed so as to cross

the path of and commingle with the oil, or oil spray, it does so no more than was done by many instances in the prior art cited, many of which also show the " restriction " either of the metal register casing or the fire-brick-lined furnace opening.

Note especially:

Billow, Exhibit C–7.
" Engineering," Exhibit C–16.
Normand, Exhibits D–4 and D–7.
Laing, Exhibits D–6 and D–8.
Meyer, Exhibit C–13.
Bevis, Exhibit D–5.

The claims of the patents, in view of the state of the prior art, cover a very narrow invention; if the patents are different from the prior art by reason of their limitation to the use of a gaseous medium to atomize the oil, the Government does not use them (*Foley* v. *U. S.*, 260 U.S. 667–677), because the Government follows the prior art; if construed to cover the devices of Appellee, they are void for want of novelty, because the Government follows the prior art. (*Hammond* v. *Goodyear,* 58 Fed. 411.) *Knapp* v. *Morss, supra.*

SUMMARY

In conclusion, on this point showing lack of identity between complainant's patented structures and the defendant's devices and the consequent noninfringement by the defendant of the patents, it may be repeated that the essential difference between the complainant's patents and the defendant's devices is that Appellant breaks up or *atom-*

izes the film of oil at its apex as it issues from the oil nozzle and *inside his atomizer casing 17, forming an integral part of the atomizer proper,* by his *violently* rotating *steam,* thus forming a spray, which he *then* mixes with air for combustion, while Appellee allows the film to break up by its *own motion into a spray* and *then* mixes with his spray a *mildly* moving current of air for combustion entering through the air register.

FOURTH

INVALIDITY

The patents are invalid because they show lack of novelty and invention and are moreover fully anticipated by the prior art.

Aside from the fact that the complainant's patents should if valid be construed to be limited by the prior art to his specific structures, and if so limited will not cover defendant's devices, it is submitted that they are clearly invalid and for the following reasons:

First, because they fail to show invention and indicate only the employment of mere mechanical skill.

Second, because each is disclosed fully and completely by the prior art in at least one instance, and claim 1 of patent 1066161 and claim 2 of patent 945873 are fully met by at least three instances.

A.

LACK OF INVENTION

Complainant has merely shown the ordinary mechanical skill of one skilled in the art of com-

bining the old and well-known structures of the prior art.

There was no invention in taking the *oil nozzle* of Bevis, Laing, Meyer, or Schutte; adding the *steam casing and mixing chamber* of Moore, Chaney and Wires, Billow, Anthony, Reed, Armstrong, Kermode, Pages, or Lee; the *air register* of Billow, Laing, Bevis, Meyer, or Normand; and the *furnace hole* with *refractory lining* of Meyer, Armstrong, Kermode, Bevis, Laing, or Billow.

There is no new function, no new mode of operation, no new and improved result, which are the tests of invention as distinguished from mere mechanical skill in selection or application; and even if better results had been obtained from such combination of old devices, still there would have been lacking the essential element of invention, or that something more than mere mechanical skill which the law requires.

In our opinion every element set forth in these various claims was old and well know before the date of application of these patents, and, furthermore, the identical combinations themselves have been set forth in numerous instances, and the only differences between the structures disclosed in the Stilz patents in suit and covered by the particular claims referred to, and similar structures of the prior art, was a mere matter of mechanical detail which anyone skilled in the art would have been able to supply, and did supply.

Imperial v. *Crown,* 139 Fed. 312; bottom of p. 318 (C. C. A.).

Dunbar v. *Meyers,* 94 U. S. 187; found on p. 197.

Ansonia v. *Electrical, &c.,* 144 U. S. 11.

Palmer v. *Corning,* 156 U. S. 342.

Hailes v. *Van Wormer,* 87 U. S. 353.

Pickering v. *McCullough,* 104 U. S. 310.

Royer v. *Roth,* 132 U. S. 201.

Phillips v. *Detroit,* 111 U. S. 604.

Hollister v. *Benedict,* 113 U. S. 59.

In this connection, the following quotation from the case of *Imperial* v. *Crown, supra,* is made more or less at length:

> The law does not allow mere mechanical skill to usurp the place of invention, which involves higher thought and brings different faculties into activity. It will not allow one to take from the public that which the public already has or grant exclusive privilege which the patent confers without consideration. It therefore is the duty of the courts, which, in the last analysis, are the guardians of the public interest, to scrutinize with care every attempt to establish the monopoly which the patent gives, to examine the state of the art, and to see if the idea expressed in the invention has ever been communicated to the public, and was in such a stage of development in a *prior patent* that a *skilled mechanic* working upon the plan or principle *therein suggested* could by mechanical means attain the result which the patentee attains. (Italic ours.)

Brown v. *King,* 107 Fed. 498 (C. C. A.).
Mast Foos v. *Stover,* 177 U. S. 485 at p. 493–4.
Knapp v. *Morss,* 150 U. S. 221.

Nor is an old result attained in a more economical and efficient way evidence *in itself* of patentable invention. (*Ansonia* v. *Electrical* 144 U. S. 11.)

Even if the test of commercial success is applied, the patents fail to show invention, for by Appellant's own admission his device was not commercially successful. (Appellant's brief, p. 30, par. 2.)

Ideal v. *Crown,* 131 Fed. 244 (C. C. A.).
Shipman v. *Frank et al.,* 237 Fed. 395.

And even if it had been commercially successful it would not follow that the patented combinations show invention necessary to support patentability.

Burns v. *Mills,* 143 Fed. 325 (C. C. A.).
Dowagiac v. *Superior,* 115 Fed. 886.

Even if the patented devices were improvements over the prior art, that in itself is insufficient ground on which to predicate invention—they must show invention, not mere mechanical skill.

Palmer v. *McDermaid,* 54 Fed. 509 (C. C. A.).
Pearce v. *Mulford,* 102 U. S. 112.
Knapp v. *Morss, supra.*

B

Complete anticipation by prior art and consequent invalidity of appellant's patents

The alleged invention covered by claims 6 and 7 of patent 1,066,161, even when *limited* to his exact

structure illustrated in the drawings, is shown, element for element, and in the exact combination, in the patents to Kermode (Exhibits C–8 and C–11), Armstrong (Exhibit C–12), and Lee (Exhibit C–14), except the old use of refractory lining to the furnace in the latter case, which, however, was old and well known and shown in other patents of the prior art cited herein, and especially in Billow (Exhibit C–7).

If *broadly* construed so as to include the air register of Appellee as an equivalent of the steam casing 17 of the patent 1,066,161, it is found, element for element, and in the exact combination, in the additional patents to Laing, Normand, Bevis, Meyer, the publications "Liquid Fuel Report," page 331, "Journal of American Society Naval Engineers," "Engineering," and in the Norfolk and New York tests.

The alleged invention covered by claim 1 of patent 1,066,161, even when *limited* to his exact construction illustrated in the drawings, is shown, element for element, and in the exact combination in the patents to Pages, Armstrong, Anthony, Kermode, and Lee.

If *broadly* construed so as to include the means for supplying air for combustion utilized by Appellee as an equivalent of the steam casing 17 of the patents, it is found element for element and in the exact combination in the additional prior art patents to Normand, Schutte, Meyer, Laing,

the publications "Liquid Fuel Report," "Engineering," and in the Norfolk and New York tests.

The alleged invention covered by claim 2 of patent 945,873 is also fully met both in its *limited* construction contended for, and if so *broadly* construed as to cover Appellee's devices, it is shown in the same patents and publications above set forth in connection with patent 1,066,161.

Every element set forth in these various claims was old and well known before the date of application of these patents, and, furthermore, the identical combinations themselves have been set forth in numerous instances, and the only difference between the structures disclosed in the Stilz patents in suit and covered by the particular claims referred to, and similar structures of the prior art, was a mere matter of *mechanical skill* which anyone skilled in the art would have been able to have supplied. In particular, the French patent, No. 396,476 to Pages (Exhibit D–2), discloses clearly on page 1 the identical device set forth in the Stilz patent 945,873, as covered in particular by claim 2.

In connection with Stilz' patent No. 1,066,161, every element of the three claims in suit are clearly disclosed in the patent to Lee, No. 903,736, of November 10, 1908 (Exhibit C–14), with possibly the exception of the lining of refractory material for the furnace referred to in claim 7. Such refractory linings, however, were in common use in the art and are disclosed in many of the earlier patents, and particularly, for instance, in the Billow U. S. patent No. 630,320, of 1899, (Exhibit C–7).

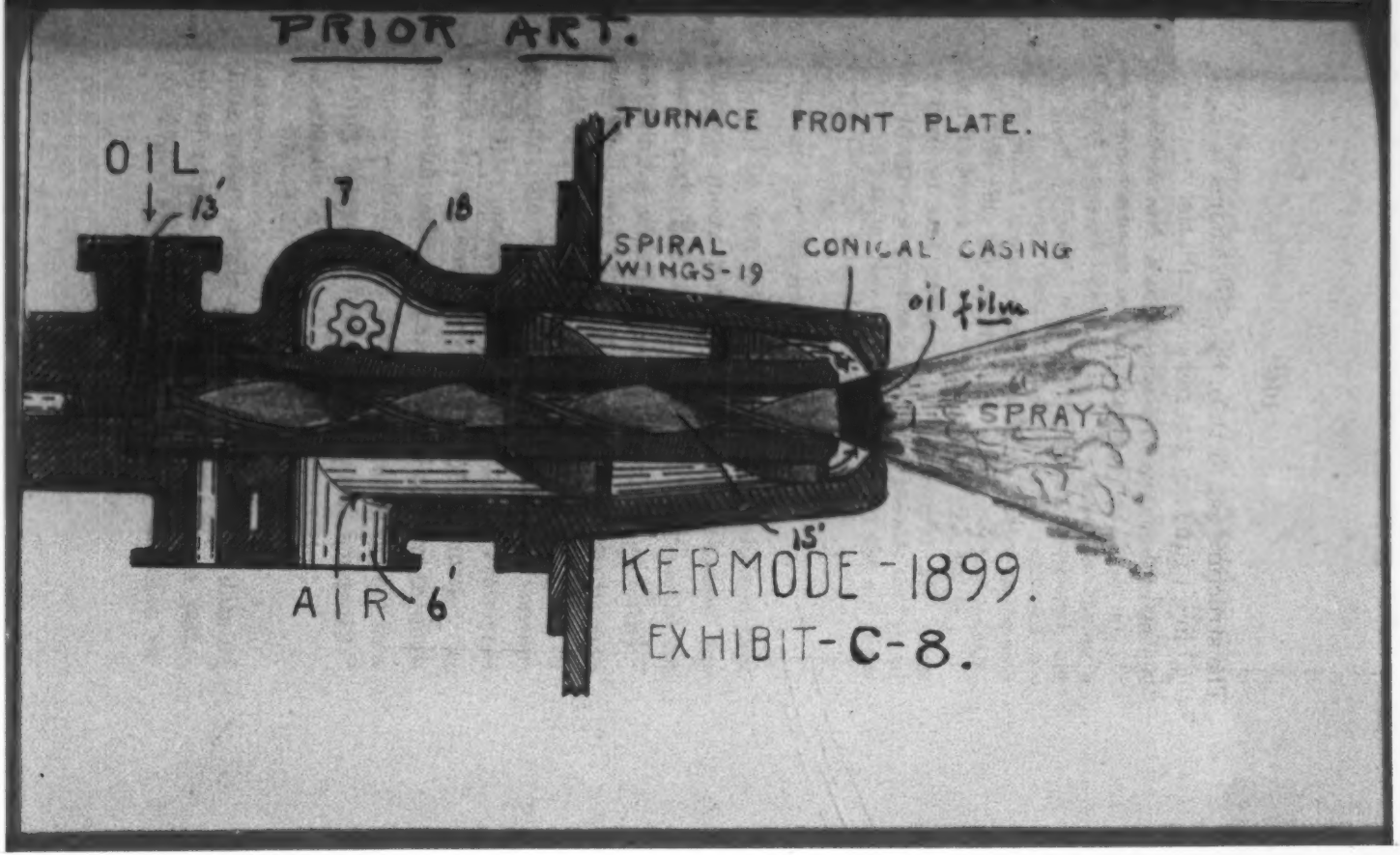
The structure set forth in the Stilz claims is identical in all fundamental respects with the structure disclosed in the Armstrong patent No. 3,089, of 1904, element for element, and in this instance the lining of refractory material of the furnace is also shown. In addition to the above every element of all the claims was disclosed in the prior art in a great many instances, which we have already referred to in considerable detail in our discussion of the prior art. The function and mode of operation of every element in these claims are also old in the art. In fact, every element of these claims has the same function and the same mode of operation as the corresponding elements of the prior art structures. To show this concretely and by specific instance the court's attention is respectfully invited to the following comparison of the patents to Kermode, Exhibit C–8, Pages, Exhibit D–2, Lee, Exhibit C–14, and Armstrong Exhibit C–12, as showing the structures, functions, modes of operation and results of the alleged invention of the patents in suit.

KERMODE.

This patent, which is dated December 5, 1899, shows all the elements of claim 2 of appellant's patent 945,873—that is to say:

CLAIM 2.	KERMODE.
1. A nozzle (1) having a restricted discharge orifice (3).	1. The nozzle 7 having an orifice restricted at its outer end, which may be regulated by adjustment longitudinally of the oil tube 18 (lines 85–88) shown closed in Fig. IX of the patent.

PRIOR ART


PRIOR ART.
FURNACE FRONT PLATE.
OIL
13'
7
18
SPIRAL WINGS-19
CONICAL CASING
oil film
SPRAY
15'
AIR
6'
KERMODE - 1899.
EXHIBIT - C-8.

2. Independent inlets for a gaseous fluid (5) and a liquid (4), there being a passage from each of said inlets to the discharge orifice.	2. The independent inlets 13′ for oil, and 6′ for air, there being a passage from each of said inlets to the discharge orifice.
3. Said passages having a portion in common which forms a mixing chamber. (The annular conical space between the plug (2) and the casing (1) Fig. 2.	3. The passages having a portion (not numbered, but just inside the restricted orifice of the nozzle) in common which forms a mixing chamber. (See lines 95–96.)
4. Each of said passages being arranged to produce a rotary motion in the fluid passing through toward the discharge orifice. (Passages are tengential.)	4. The spiral 15′ (lines 76–79) for the oil; the "spiral wings" 19 for the air (lines 89–91.)

It will be seen without parallel comparison that Kermode meets term for term and element for element claim 1 of patent 1,066,161, the "means for producing a whirling motion in the liquid fuel" being the spiral 15′ of Kermode; the "casing surrounding" the oil nozzle being the casing 7 of Kermode; the "restricted discharge port concentric" with the discharge orifice being the restricted opening in the shell or casing 7 of Kermode; the "means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current" being the "spiral wings 19" of Kermode.

PAGES

This patent while dated later than the date of filing of patent 945,873 in suit, contains a statement which shows that the general function of

atomizing fluids by introducing them at an angle into a conical chamber where they whirl and mix and then emerge through a single opening in the form of an expanding cone, was old and well known at the time of applying for the Pages patent—that is in January 1908, before the application for patent 945,873 was filed.

The Pages patent therefore clearly shows the structure of patent 945,873 to be old. It shows the restricted discharge orifice, independent liquid and gaseous fluid inlets with the passage from each to the discharge orifice, having a portion in common forming a mixing chamber, and each passage arranged to produce a rotary motion in the fluid passing through the discharge orifice.

As bearing on patent 1,066,161, Pages is fully and completely anticipatory, showing the nozzle (2) having a small discharge orifice (y); means immediately adjacent to said orifice for producing a whirling motion in a liquid fluid passing therethrough (the tangential passages 1); a casing surrounding said nozzle (3–4) and having a restricted discharge port concentric with said orifice (5), and means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current (the tangential passage 8).

LEE

It is thought to be unnecessary to compare the structure of Lee literally and specifically with the patent claims, but examination of the patent to

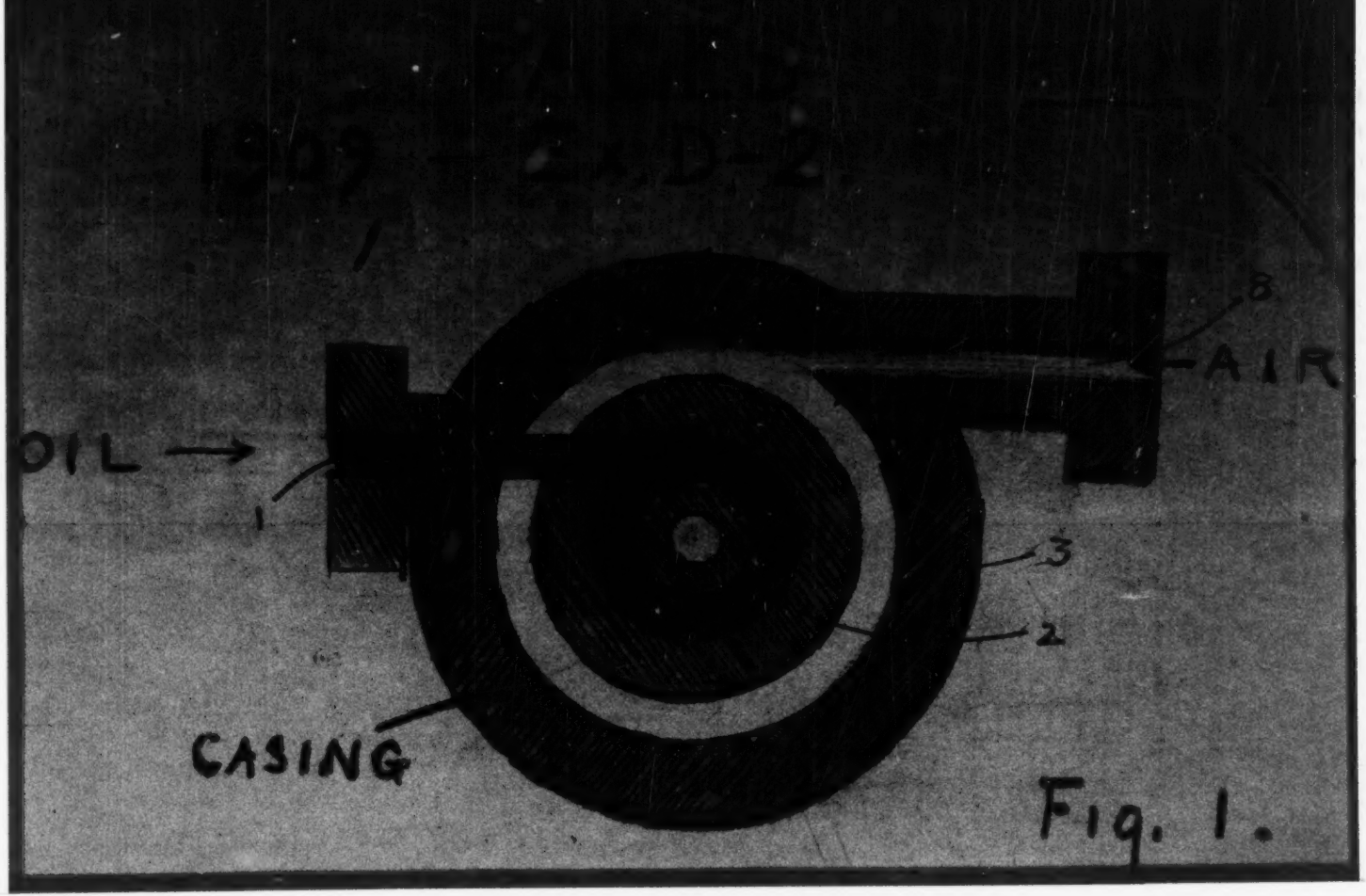
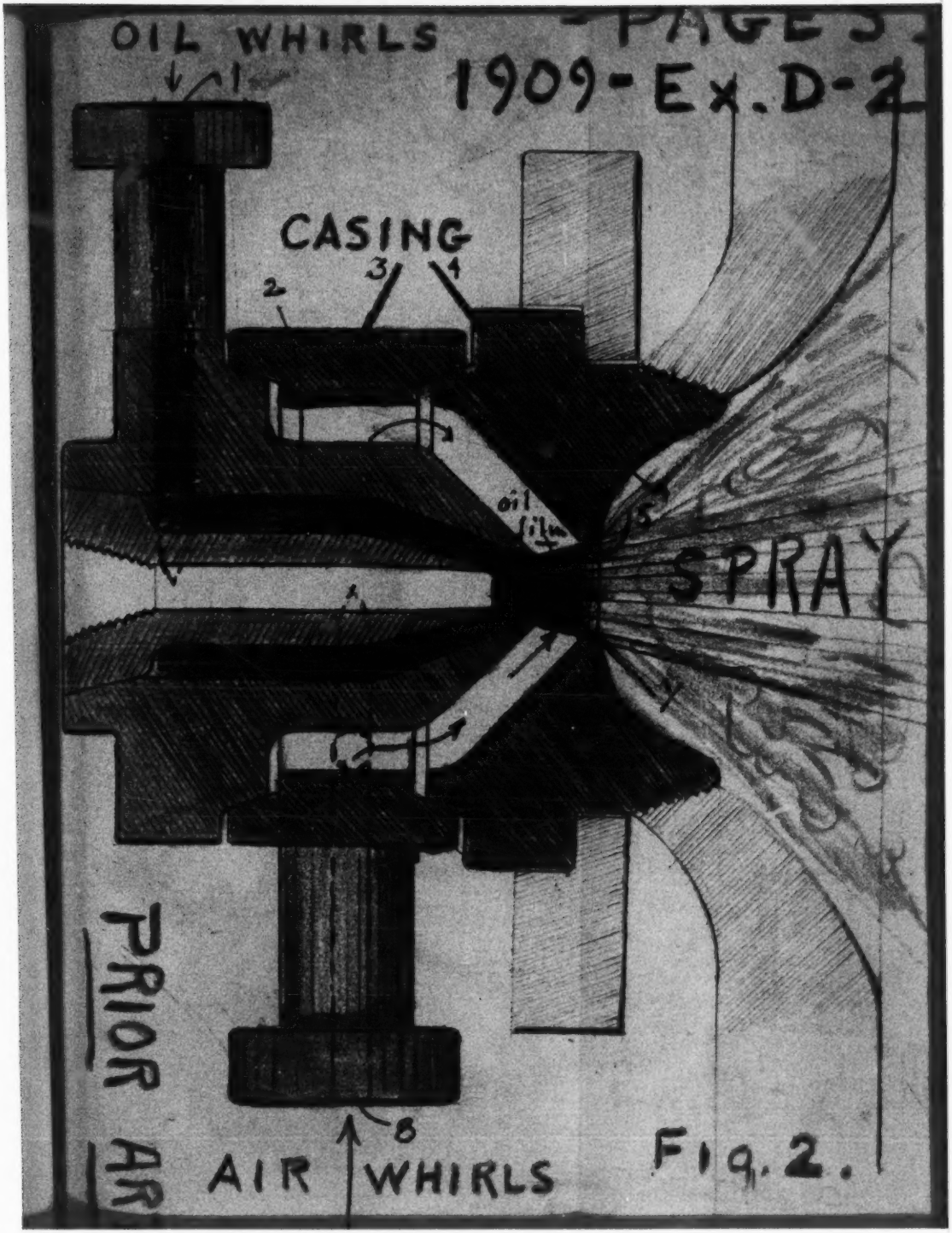
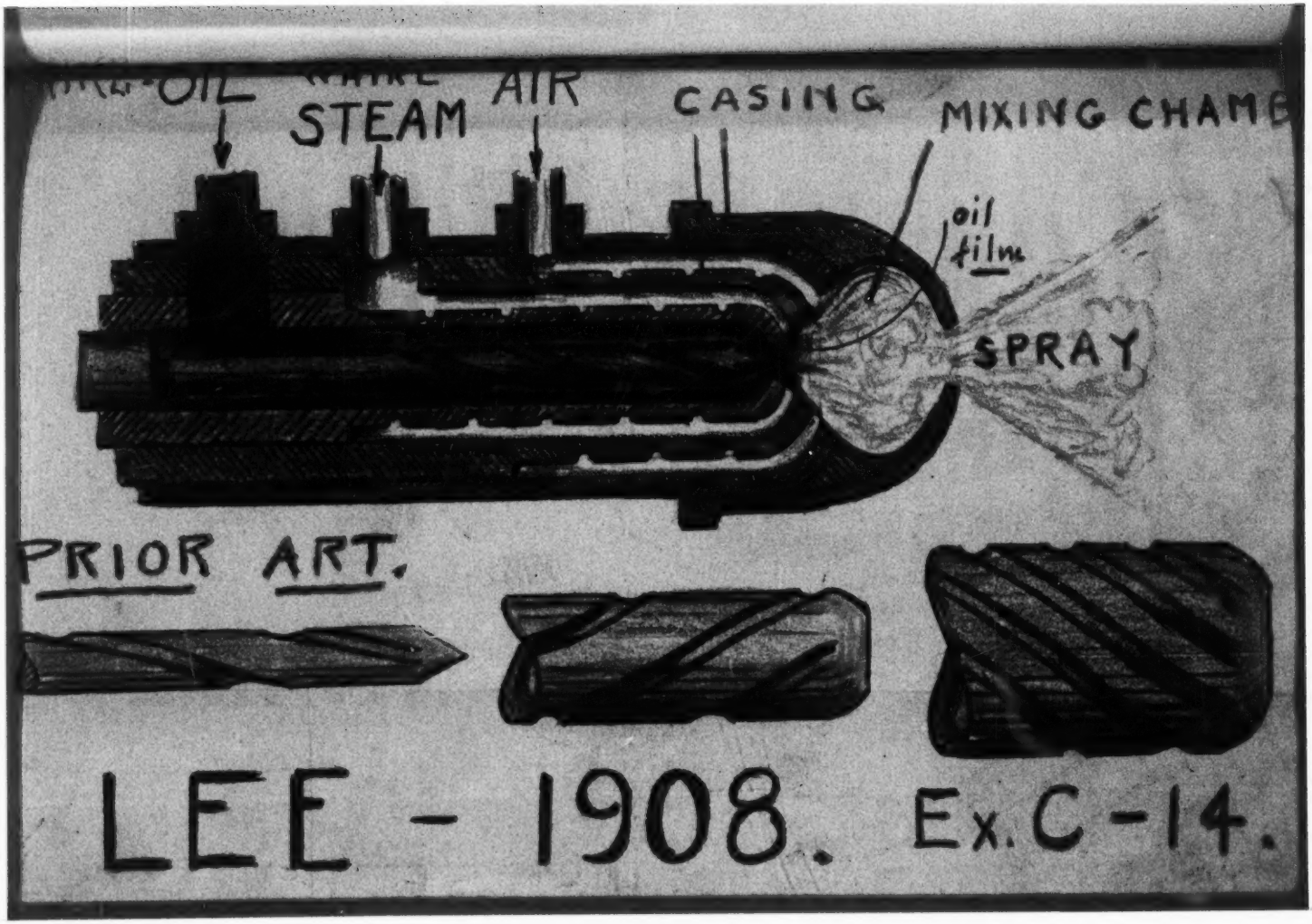


Fig. 1.


OIL WHIRLS
1
1909-Ex.D-2
CASING
3
4
2
oil film
5
SPRAY
PRIOR AR
AIR
6
WHIRLS
Fig. 2.


OIL
STEAM
AIR
CASING
MIXING CHAMB
oil film
SPRAY
PRIOR ART.
LEE - 1908.
Ex. C-14.

Lee shows that all the features of both patents are fully disclosed—the independent inlets for the two fluids, the casing, the mixing chamber, the restricted orifice, the means for whirling both fluids, and particularly the function of causing the whirling gaseous medium to impinge upon and penetrate the oil film at its apex with the casing and before its issuance from the orifice of the casing, resulting in its atomization *in the casing*. Attention is particularly invited to lines 28–36, inclusive, on page 1 of the Lee patent, where spiral grooves are described as causing the "ingredients to be spirally discharged into the mixing chamber in order that an effective mixture of the ingredients be accomplished." The depth of these grooves is merely a matter of degree.

ARMSTRONG

Finally the patent to Armstrong is a complete and absolute anticipation of claim 2 of patent 945,873 and claim 1 of patent 1,066,161, for it not only shows or specifies all the parts comprising the elements of these claims, but it describes the actual mode of operation claimed by appellant to be the gist of his alleged invention. In lines 33–36, page 7, Armstrong says:

> The spraying agent (steam or compressed air) passes from the supply pipe *s* into the annular space between the hollow spindle *h*

> and the outer tube *b'* and issues from the orifice *s'* so *impinging* on the issuing oil stream and *breaking it up* into a fine *spray.*

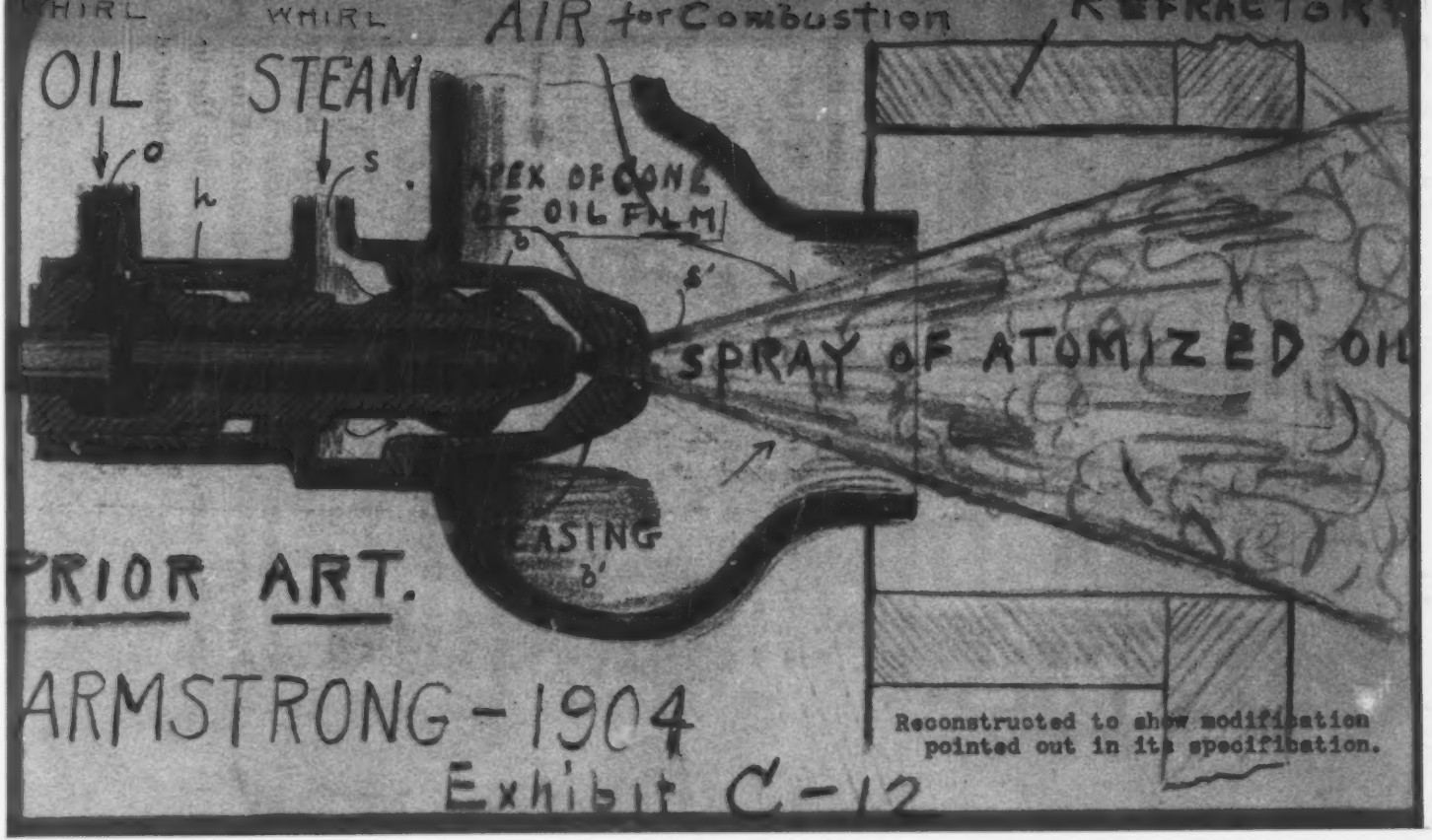
While the drawings of the Armstrong patent do not show means for whirling this air or steam, yet the specification distinctly points out in lines 12–14 (p. 5):

> Spiral ribs or grooves may be provided in the oil and (or) spraying agent passages for the purpose of imparting a rotary movement to the steam.

And we have so illustrated them at page 107. As to claims 6 and 7 of patent 1,066,161, these claims are merely for a combination of the specific atomizing nozzle set out in claim 1 with the well known "furnace having an admission hole through its casing" (as all furnaces have) with additional means for supplying air to the atomized fuel for the purpose of securing complete combustion, and for that only. As has been shown, these additional means for supplying air for combustion are as old as the art of burning oil, are shown in all the exhibits in suit where the atomizer is applied to a furnace, and require no invention.

The "lining of refractory material" made an additional element of claim 7, is equally old, and is shown in many of the exhibits, notably Exhibits C–7, C–12, C–13, D–5, and D–8.

Therefore, both on the ground of lack of invention and complete anticipation, we affirm the invalidity of the patents, and, under the doctrine of


WHIRL
WHIRL
AIR for Combustion
REFRACTORY
OIL
STEAM
o
s
h
APEX OF CONE OF OIL FILM
b
s'
SPRAY OF ATOMIZED OIL
CASING
b'
PRIOR ART.
ARMSTRONG - 1904
Reconstructed to show modification pointed out in its specification.
Exhibit C-12

Imperial v. *Crown, supra,* which we believe to be a principle approved by this court, we respectfully urge the court to so find.

FIFTH

Appellant's failure to comply with the statute requiring him to mark his devices as patented, or give appellee notice of alleged infringement.

Under Section 4900 of the United States Revised Statutes this marking or the giving of actual notice is essentially a prerequisite to the recovery of damages.

The section reads:

> SEC. 4900. It shall be the duty of all patentees, and their assigns and legal representatives, and of all persons making or vending any patented article for or under them, to give sufficient notice to the public that the same is patented, either by fixing thereon the word "patented," together with the day and year the patent was granted, or when, from the character of the article, this can not be done, by fixing to it, or to the package wherein one or more of them is inclosed, a label containing the like notice; and in any suit for infringement, by the party failing so to mark, no damages shall be recovered by the plaintiff, except on proof that the defendant was duly notified of the infringement, and continued, after such notice, to make, use, or vend the article so patented.

The act of 1918 under which this suit was brought provided that—

> The United States may avail itself of any and all defenses, general or special, that might be pleaded by a defendant, in an action for infringement,

This defense of noncompliance with section 4900 was therefore available to the Appellee, and was set up in the court below; and the court found as a matter of fact that—

> It does not appear from the evidence whether the plaintiff gave to the public the notice required by section 4900 of the U. S. Revised Statutes as to the devices of his said letters patent being patented, or that he at any time during the alleged infringement of said letters patent for which recovery is sought by him notified the defendant of such alleged infringement. (Finding XII.)

Since, therefore, the statute makes such marking or notice compulsory, and this court has so held, for it said in *Dunlap* v. *Schofield,* 152 U. S. 244, at p. 248:

> One of these two things, marking the articles, or notice to the infringers, is made by the statute a prerequisite to the patentee's right to recover damages against them. Each is an affirmative fact, and is something to be done by him. Whether his patented articles have been duly marked or not is a matter peculiarly within his own knowledge; and if they are not duly marked, the statute expressly puts upon him the burden of proving the notice to the infringers, before he can charge them in damages. By

> the elementary principles of pleading, therefore, the duty of alleging and the burden of proving either of these facts is upon the plaintiff.
>
> (See also *Coupe* v. *Royer,* 155 U. S. 565 at p. 584.)

and since the court below found there was no evidence that there had been such marking or notice (Finding XII).

We submit that there is no ground for recovery, and that the conclusion of the court below to that effect presents no question of law, the determination of which can lead to reversal.

SIXTH

Appellant's employment by the Government at the time when he made application for patent 1,066,161, precludes him from recovering under this patent.

The Act of 1918 in its third proviso reads:

> Nor shall this act apply to any device discovered or invented by such employe during the time of his employment or service.
>
> *Harley* v. *U. S.* 198 U. S. 229;
> *Moore* v. *U. S.* 249 U. S. 487;
> *Gill* v. *U. S.* 160 U. S. 426.

The court below found as a fact (Finding III):

> On the 8th of May, 1911, the plaintiff, while in the employ of the United States at the Mare Island Navy Yard, filed an application with the United States Patent Office for letters patent on certain improvements in oil burners, upon which application there were granted to him, under date

of July 1, 1913, United States Letters Patent No. 1,066,161, a copy of which is by reference made a part hereof as Exhibit B.

The date of application for a patent is *prima facie* the date of the alleged invention thereof, in the absence of evidence tending to show an earlier date.

McCormack v. *Cleal,* 12 App. D. C., 337;
Mergenthaler v. *Scudder,* 11 App. D. C., 265;
Knapp v. *U. S.,* 46 C. Cls. 601 at 639, 644.

Therefore, since the date of filing of the application is prima facie the date of invention (no earlier date having been shown); since the court found that on that date appellant was in the employ of the appellee; and since the statute expressly precludes such employee from recovery on such a patent, we submit that there can be no recovery under this patent even if infringement had been proven, and that the conclusion of the court below that there could be no recovery presents no question of law, the determination of which can lead to reversal.

SEVENTH

The pending of a suit against another person in another court on a claim for infringement of the same patent here in suit, because of the manufacture of certain devices alleged to have been sold for use of the Government; which suit was pending at the time of filing appellant's petition in the Court of Claims, precludes appellant from recovery from the Government for the use of those devices and should have prevented his appeal to this court from the decision of the Court of Claims.

Section 154 of the Judicial Code is as follows:

> No person shall file or prosecute in the Court of Claims, or in the Supreme Court on appeal therefrom, any claim for or in respect to which he or any assignee of his has pending in any other court any suit or process against any person who, at the time when the cause of action alleged in such suit or process arose, was, in respect thereto, acting, or professing to act, mediately or immediately, under the authority of the United States.

The court below found as follows (Finding XIII):

> At the time of the filing of plaintiff's petition in this suit there were pending in the United States District Courts for the Southern District of New York and the Eastern District of Pennsylvania, respectively, suits by the plaintiff against Babcock and Wilcox Company, of New York City, and the Schutte & Koerting Company, and the Bethlehem Shipbuilding Corporation, of Philadelphia, Pa., for an injunction against each of the defendants in said suits and an accounting by them for profits for alleged infringement by them of the plaintiff's said Letters Patent No. 1066161 in the manufacture and sale by them of certain oil burners, some of which were alleged to have been sold to the United States Navy for installation and use on naval vessels of the United States.

> It appears from the evidence that the suit against the Babcock & Wilcox Company was pending in the court as late as February 14, 1922, and the suit against the Schutte & Koerting Company and the Bethlehem Shipbuilding Corporation as late as January 22, 1923; and it does not appear that either suit has yet been dismissed or otherwise finally disposed of in said courts.

Since this finding, at the trial of the suit against the Babcock & Wilcox Company in the District Court in New York, Plaintiff (this Appellant) withdrew all claim for manufacture for the government. The suit in the Eastern District of Pennsylvania, however, appears to be still pending.

It is submitted, therefore, that the appellant cannot recover under this patent for infringement in the use of devices manufactured for the government by the Schutte & Koerting Company, and the Bethlehem Steel Company, even if such devices did in fact infringe; and that the appellant should not have been permitted to prosecute this appeal in this court, in so far as it relates to the use of such devices by the appellee; and further, that the conclusion of the court below that there could be no recovery presents no conclusion of law the determination of which can lead to reversal.

CONCLUSION

1. As the court below, after considering full and contentious evidence concerning the complicated subject matter, has found as a fact that the appellee

does not use appellant's devices, there is no error in law in the conclusion that appellant can not recover.

2. The patents and the terms of their claims do not cover appellee's devices.

3. The patents are invalid because not embodying invention and because they are anticipated by the prior art.

4. Appellant's failure to show that he complied with the statute requiring the marking of the devices as patented or giving actual notice to the United States, bars him from recovery of damages or compensation even if they had been used.

5. Because he was in the employ of the United States at the time of filing his application for patent 1,066,161, he can not in any event recover on that patent under the act of 1918 (40 Stat. 704) because of the last proviso thereof.

6. Because he has pending in another court a suit against a corporation, which at the time when the cause of action alleged in such suit arose was in respect thereto acting mediately or immediately under the authority of the United States he cannot recover in view of the statute 36 Stats. L. 1135. (Judicial Code, sec. 154.)

Respectfully submitted.

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HARRY E. KNIGHT,
JOHN W. LOVELAND,
Special Assistants to the Attorney General.

February 28, 1925.

APPENDIX

United States Circuit Court of Appeals for the Second Circuit

Harry B. Stilz, appellant, against The Babcock & Wilcox Company, appellee.

Before Rogers, Hough, and Manton, Circuit Judges.

Appeal from the United States District Court for the Southern District of New York. Suit for infringement of patent No. 1,066,161. Decree for defendant; plaintiff appeals. Affirmed.

HARRY B. STILZ,
Appellant in Person.

GIFFORD & SCULL, Esq.,
Solicitors for Appellee.

LIVINGSTON GIFFORD, Esq.,
GEORGE F. SCULL, Esq.,
Of Counsel.

MANTON, *Circuit Judge.*

This suit is for infringement of patent No. 1,066,163 granted July 1, 1913 to appellant. The claims in suit are 1, 5, 6, and 7 and are as follows:

"1. A nozzle having a small discharge orifice, means immediately adjacent to said orifice for producing a whirling motion in a

liquid fluid passing therethrough, a casing surrounding said nozzle and having a restricted discharge port concentric with said orifice and means for causing a gaseous fluid passing through the space within said casing to enter said port in a whirling current.

"5. A liquid spray nozzle having a passage abruptly contracted at one end by a cone-shaped surface into a small deliver orifice, a transverse spiral within said passage and resting against the base of said cone-shaped surface, a casing surrounding said nozzle and having a restricted discharge port in line with said orifice and means within said casing for whirling a gaseous fluid passing therethrough.

"6. In combination, a furnace having an admission hole through its casing, a nozzle having means for projecting a hollow cone-shaped film of oil from a round unobstructed delivery orifice into said furnace through said hole, means surrounding said nozzle for producing a whirling stream of gaseous fluid directed so as to penetrate said film of oil and means for supplying air into the furnace through said hole.

"7. In combination, a furnace having an admission hole through its casing, a lining of refractory material for said hole, a nozzle having means for projecting a hollow cone-shaped film of oil into said furnace through said hole, means surrounding said nozzle for producing a whirling stream of gaseous fluid

directed so as to penetrate said film of oil, and means for supplying air into the furnace through said hole."

Oil burners have been used for many years commercially in burning fuel oil. The inventor says his invention relates to improvements in oil burners in which the oil is atomized principally by mechanical means and has for its object to produce a burner which shall be simple in construction and reliable and efficient in operation. In the patent appellant points out that in burning fuel oil, atomized in passing through the nozzles which spray it in a fine film by mechanical means, it has been necessary for obtaining the best results, to preheat the oil to such an extent that a portion of it will flash into vapor on encountering the lower atmospheric pressure. He points out that with these burners, some trouble has been experienced in starting the fire in a cold boiler without producing considerable smoke. He says that some fuel oils have such a small percentage of volatile matter that it is necessary to preheat the oil to such an extent that a portion of it will flash into vapor as it enters the furnace and that when an ordinary mechanical atomizer such as a spiral (15) and orifice (14) is used, some trouble has been experienced in starting the fire in a cold boiler without producing considerable smoke. In order to secure perfect combustion with this kind of boiler, the inventor says that "a suitably directed jet of steam is a valuable adjunct for securing perfect atomization"; the steam introduced acts on the oil and produces results similar to those produced by the vapor where oils which can be partially vapor-

ized are used—steam is brought into action upon the oil in such a manner that the mechanical action (effect of spiral (15) and pressure on oil) is not interfered with.

The patent provides for a *casing which is placed directly over the end of the mechanical sprayer;* the casing having an annular conical passage leading down to an orifice (14) concentric with the orifice (14) closely adjacent to it, and he directs high pressure steam through the pipe into the annular passage, the steam rotating around the passage (18) and finding its way to the orifice (19) cutting *across* and *into* the *cone* of *liquid oil just emerging from the orifice* (14). When the mixture of steam and oil emerges from the orifice (19) it (is) has(?) the combined energy of the oil pressure in the pipe (9) and the energy given by the rapidly moving steam particles coming through the pipe (10). Oil is *then* broken up into a fine spray under the conditions of the heat and pressure which *would not be sufficient to form such a fine spray if the mechanical atomizer alone were used.* This, his adjunct to his mechanical atomizer, takes the form of the jet of steam. The inventor also shows a preferred form of supplying combustion air. It is a register 4 over the hole 8 in the furnace wall, this register being supplied with openings 5 through which the air will be drawn by the furnace draft; this air will move in a path such that it will impinge upon the spray cone at approximately right angles to the path of the oil drops of the spray. He says he can reduce and even shut off completely the steam jet after his fire has been started and the high furnace temperature reached, the greatest quantity of steam being used when the fire is being

started. One of the objects of the new invention is the ability to shut off this " adjunct " and yet maintain perfect combustion.

The steam may be shut off when the furnace is hot because the heat from the furnace will heat the burner and raise the temperature of the incoming oil so that the mechanical atomization alone will be sufficient to form the required spray. In other words, the steam adjunct is used merely to supplement the mechanical atomizer when working conditions are bad. *It is the atomizing of the oil or the formation of the spray that the inventor is chiefly interested in.* The subsequent combustion is referred to in the patent, for it states that the hole 8 in the furnace is made large enough not to interfere with the cone of oil spray and yet small enough to compel the combustion air flowing through into the furnace through the hole 8 to contact with the atomized oil. The patent points out that the inventor can either cause the spray cone to completely fill the hole 8 or to pass through the hole spaced from its edge. This will depend on the distance of the burner from the opening 8 and on the angles of the spray cone and this latter in turn will depend on the adjustment as to a steam flow and oil pressure. There is refractory surrounding the hole 8 and after the burner has been in operation a short time, the heat from this refractory will assist the combustion, the oil spray and the combustion air having been mixed somewhat at least before reaching this refractory. In operation, it was found that the inventor's burner atomized perfectly without the steam jet and when the temperature or pressure or both were dropped until the mechanical

atomizer would not atomize, then on turning on the steam jet, atomization would be produced.

It was found also that the mechanical atomizer must be working to at least such an extent that a cone of liquid would be formed beween the orifice 14 and the orifice 19 of sufficient angle to fill the orifice 19, otherwise the stream would simply circulate around the chamber 18 and out of the orifice 19 through the space between its walls and the column of liquid being projected through the orifice 19, and from the orifice 14. Thus the steam jet, in order to have an effect, must be so enclosed that it will be directed into the cone of liquid which emerges from the mechanically atomizing orifice. The oil *did not leave the inner orifice in the conical spray.* It has not broken into *a spray at this time—it is a continuous liquid cone.* If it were a spray, the steam would escape through part of the orifice 19 without producing any effect on the oil. After the oil is atomized, it is impossible to break up the drops. The atomizing steam must be directed at a point on the conical film of oil emerging from the mechanical atomizer at 14 before the oil has traveled far enough to break into any kind of a spray and the orifice must be restricted to the size of the outlet in 14 in order that the oil film will be caught by the rotating steam to be perfectly atomized. Outlet port 19 is therefore restricted and the casing 17 surrounding the nozzle is provided for. In other words, port 19 is made small enough so that the mechanical oil film will fill it and act like a valve

to prevent the escape of the steam without penetrating the film so that it may be atomized.

In Claims *1 and 5* this restricted discharge port *means a small opening 19 somewhat larger than the small discharge orifice 14 of the nozzle 12 and in a casing 17 surrounding said nozzle, that is, so close to it that the gaseous fluid (steam) will be directed into the conical film emerging from the small discharge orifice.* In Claims 6 and 7, these elements are described as means surrounding the nozzle for producing a whirling stream of the gaseous fluid (steam and compressed air) directed so as to penetrate said *film* of oil, while the hollow cone shaped film of oil is issuing from the orifice 14 in a nozzle 12. It thus appears the invention is limited strictly on the face of the patent to the structure shown in the drawings.

In the appellee's device, highly heated oil under high pressure, enters pipe 4′, flows through passages 7′ to the outer ends of tangential passages 12′ into the bottom of a conical recess 15′ where it is whitled as it moves to the orifice 14′, this cone extending a very short distance from one-quarter to one-half an inch. The film then breaks up into fine drops which continue on in straight lines forming a continually enlarging cone of oil spray. The appellee's device does not atomize by the pressure on the oil only. It is a mechanical atomizer, not a combined mechanical and steam atomizer, as is the appellant's. In order to mix combustion air with the oil spray before and as it enters the furnace chamber, the appellee provides an air register over the hole 1 in a furnace wall, this register having openings 5 through which the air enters.

Openings 5 are provided with movable vanes which are used to regulate the size of the openings and therefore the amount of combustion air which will enter the furnace.

These vanes also act to direct the air into the register tangentially make and it whirl. A casing 3 leads from the register to the opening 1, this casing being conical and having spiral blades in it at relatively low pitch to give a relatively slow turning motion to the combustion air flowing into the furnace. The appellant's embodies a combined mechanical steam atomizer either alone or as may be read from Claims 6 and 7, in combination with means for supplying combustion air. Appellee uses a mechanical atomizer only and as a means for supplying combustion air to the oil spray. This specific means is different in many respects from the appeliant's for supplying combustion air. When the appellant's burner is operating, he is using three fluids to produce his result, oil, high pressure atomizing steam or air, and low pressure combustion air, and the appellee uses two only, oil and low pressure combustion air. The appellant can shut off one of the fluids and still have his device working satisfactorily at times, but the appellee cannot shut off one of the fluids without stopping the operation.

Appellant contends that the appellee's mechanical casing 3 surrounding the oil nozzle and the end of the casing as the restricted discharge port reads on Claims 1 and 5—the means for whirling the gaseous fluid being the curved vanes in the casing 3 and the inclined doors at the opening 5. The gaseous fluid of these claims being the combustion air.

The appellant seeks to read Claims 6 and 7 by saying the impeller plate 15 which has become the means for producing the whirling stream of gaseous fluid, directed so as to penetrate the film of oil while the casing 3 and the openings 5 have become the means for supplying air into the furnace. But in making this contention for Claims 1 and 6, the appellant is obliged to designate different parts of appellee's structure to meet the same elements in the different claims. In Claim 1 appellant employs language without regard to meaning of the claim as determined by his specification, and this can be done because the functions of the elements are omitted in that claim. But as to Claim 6, the elements are described by a recital of other functions and appellant necessarily selected the part, from which he argues that it has the function called for, and this part in appellee's structure is not a part which responds to the description of the same element in Claim 1. He argues that the impeller plate 15 is the equivalent of a casing having a restricted discharge port. Notwithstanding the existence and use of both the impeller plate and the cone 3 in appellee's device, as the appellant argues, the impeller plate 15 is the equivalent of casing 3 in appellee's structure. If the two devices were alike in structure or function, there would be no difficulty in reading one or many claims of the patent in suit in the same way on appellee's device, but there is no reason for designating different parts of appellee's

device as the same element in appellant's claims according to whether the claim describes that element generically or specifically.

The sole function of the bladed cone 3 of appellee, is to cause the low pressure combination air to mix thoroughly within the oil spray after the latter is formed and it has nothing to do with the atomization. It is not contended in reading Claims 6 and 7 to designate the air register cone 3 of appellee as a means which directs the whirling steam " so as to penetrate the film of oil." But instead, the impeller blade 15 of appellee is assigned to that element of Claim 6. The air passing through the impeller blade of appellee's device, plays no part in the atomization and does not penetrate the film of oil. The length of the mechanical film of oil in appellee's burner, measured from its apex to the atomizing orifice, is one-quarter to one-half an inch long before the oil breaks into a spray, the length of the cone depending on the pressure and the viscosity of the oil. If air in the appellee's device is to have any function in atomization, it must be directed so as to penetrate said film of oil as it issues from the atomizing nozzle and before it breaks into drops. Air directed in a cone of oil spray will not in any way affect the atomization, whereas a stream of steam or air under high pressure directed into the oil film will have an atomizing effect, the pressure necessarily being sufficient to give velocity to the atomizing medium—steam or air.

We are satisfied that in the appellee's structure the oil is not directed into the oil film but into the oil spray, the air is not moving at sufficient velocity to atomize even if it were directed into the oil film,

and tests made on the appellee's device prove that there is no difference in the atomization, whether the air is flowing or not. The air passing through the slots of the impeller blade is not directed to penetrate the oil film because the impeller blade is too far in advance of the apex of the cone and because the air continues to move away from the axis of the cone rather than toward it. The velocity of the air through the impeller blade 15 would have no effect on the cone of oil film even if it did strike it. In the test made upon the appellee's structure, where the white cards were passed quickly across the oil spray, one with the air on and the other with the air off, it resulted in showing that the oil drops in the two cases were about the same. The inflowing combustion air passing through the appellee's impeller blade 15 could not, in theory or practice, have any effect on the oil atomization so that it does not function like the high pressure steam of the appellant's structure in the matter of atomization. It is apparent that the alleged infringing device will produce a better mixture of the combustion air and the oil spray so as to give more perfect combustion—not atomization—for in appellee's device that is completed by the mechanical atomization alone.

Having reached these conclusions, there is no basis upon which to support the appellant's claim of infringement. We therefore need not consider the question of the validity of the patent which has been argued at bar. The decree below holding that there is not infringement is affirmed.

Decree affirmed.

(Italics in above decision ours.)

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SUPREME COURT OF THE UNITED STATES.

No. 38.—October Term, 1925.

Harry B. Stilz, Appellant,
vs.
The United States.
} Appeal from the Court of Claims.

[November 16, 1925.]

Mr. Justice Butler delivered the opinion of the Court.

Plaintiff brought this action, under the Act of Congress approved July 1, 1918, c. 114, 40 Stat. 705, to recover compensation for the use and manufacture, by or for the Navy Department, of certain oil burners alleged to infringe Patents 945873 and 1066161, granted him January 11, 1910, and July 1, 1913, respectively. The Court of Claims filed findings of fact and conclusion of law (59 C. Cls. 21), and adjudged that plaintiff was not entitled to recover.

The substance of the findings in respect of the prior art, the burners covered by plaintiff's patents, and the burners manufactured and used by the United States and alleged to be infringements may be indicated briefly. Each of these patents was for improvements in oil burners. In order successfully to be used for fuel, oil must be atomized to permit its mixture with the proper amount of air for combustion. In the prior art to which plaintiff's patents relate, there were numerous structures disclosed by patents and publications referred to in the findings, including two types of burners in use and known respectively as mechanical atomizers and steam atomizers. In the former the oil is atomized by means purely mechanical. It is projected, under heavy pressure from the burner into the furnace in a whirling cone-shaped film, which almost immediately develops into fine spray. In the latter there is a combination with the oil, while yet within the burner proper, of a stream of steam, air, or other gaseous fluid under pressure for the purpose of aiding the atomization. In both, air for combustion is admitted through a surrounding register and is more or less intimately intermixed with the oil spray.

The burner covered by Patent 945873 provides for the use of steam, air or other gaseous fluid under pressure to aid in atomiza-

tion of the oil. The oil, under heavy pressure, is discharged tangentially into the annular space of the nozzle between the outer casing and center plug, thus giving the oil a rotary motion in the nozzle. The steam or other fluid, under heavy pressure, is also discharged tangentially into this space in the same direction as the oil with which it rotates; and thus aids in atomizing the oil, which issues from the orifice of the nozzle at a high velocity through an air register and into the furnace in a cone-shaped film and spray. Air for combustion is supplied through the register, and mixes with the oil spray in it and in the furnace.

The burner covered by Patent 1066161 also provides for the use of steam, air or other gaseous fluids under pressure as an aid in the atomization of the oil. This device includes an annular space between inner and outer casings of the nozzle. The oil and steam are not brought together until after the oil, under heavy pressure, is forced through a spiral and orifice into the front of this space in a rapidly rotating cone-shaped film. The steam, air or other fluid passes through a pipe under heavy pressure and is discharged tangentially into this space, rotating towards the outer orifice in a whirling layer. The oil leaving the inner orifice is struck by the rotating steam before it passes through the outer orifice. Air for combustion is supplied through a circular register attached to the front of the furnace through the center of which the oil is projected from the nozzle into the furnace in a cone-shaped spray. The air flows around the oil spray and mixes with it in the register and in the furnace where combustion takes place.

The type and character of the oil burners and equipment manufactured and used by the United States, and which are alleged by plaintiff to infringe his patents, are indicated by the findings. These oil burners and equipment provide for the atomization of the oil by means of its projection into the furnace under heavy pressure through spiral passages in the nozzle of the burner in a whirling cone-shaped film which almost immediately upon leaving the nozzle develops into fine spray. The air for combustion is furnished under mild blower pressure in the furnace room through an air register surrounding the burner and burner opening into the furnace. The register is provided with vanes or other means for giving the air a whirling motion to facilitate the intermixture with the oil spray. The oil and air are whirled together in the same direction. No steam, air, or other gaseous fluid is

introduced into or used in the burner proper for any purpose, nor used with any part of the equipment for the atomization of the oil. The air, which passes through the register encircling the burner, is to supply oxygen necessary for combustion.

From the findings it clearly appears that the mixing of the steam, air or other gaseous fluid with the oil in the annular space to aid atomization before the spray is brought into contact with the air supplied for combustion and before it passes into the furnace is the important feature distinguishing the burners covered by plaintiff's patents from those above described which are manufactured and used by the United States. The Court of Claims expressly found, "It does not appear that any of the devices of the plaintiff's said Letters Patent No. 945873 and No. 1066161 have been manufactured or used by the United States, or that said letters patent have been infringed by the United States."

Infringement is a question of fact. The quoted finding is in the nature of special verdict of a jury. *United States* v. *Anciens Etablissements,* 224 U. S. 309, 322, 330; *Brothers* v. *United States,* 250 U. S. 88, 93. This Court accepts the findings of fact made by the Court of Claims and cannot review them. *Collier* v. *United States,* 173 U. S. 79, 80. And even where a finding determines a mixed question of law and fact, it is conclusive unless the court is able to separate the question to see whether there is a mistake of law. *United States* v. *Omaha Indians,* 253 U. S. 275, 281; *Ross* v. *Day,* 232 U. S. 110, 116; *Whitcomb* v. *White,* 214 U. S. 15, 16; *Marquez* v. *Frisbie,* 101 U. S. 473, 476. Our consideration of the case is confined to questions of law. *Union Pacific Railway Co.* v. *United States,* 116 U. S. 154, 157; *Keokuk & Hamilton Bridge Co.* v. *United States,* 260 U. S. 125. And the situation is the same as it would be if the facts had been agreed upon by the parties. *United States* v. *Pugh,* 99 U. S. 265, 271. As no infringement was found, the facts are not sufficient to constitute a cause of action.

Judgment affirmed.

A true copy.

Test:

Clerk, Supreme Court, U. S.